

**Oribatids from Sabah (East Malaysia) VIII
(Acari: Oribatida: Dampfiellidae and Otocephidae).
(*Acarologica Genavensia* LXXXVI)**

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Oribatids from Sabah (East Malaysia) VIII (Acari: Oribatida: Dampfiellidae and Otocephidae). (*Acarologica Genavensia* LXXXVI). - Thirty-two species belonging to the superfamily Otocephoidea Balogh, 1972 are identified and listed, twenty-one of them are described as new to science: three new species belong to the family Dampfiellidae Balogh 1961, eighteen new species to the family Otocephidae Balogh, 1961.

Key-words: Acari - Oribatida: Otocephoidea - taxonomy - new species - Malaysia: Sabah.

INTRODUCTION

The Oribatid fauna of Sabah, formerly North Borneo, has been discussed in previous papers (Mahunka, 1987a, 1987b, 1988, 1990, 1991, 1995a, 1996a, 1996b). In most of my earlier papers I described various species phylogenetically far distant from each other. Later I realized that on this basis no regional zoogeographical evaluation could be made. So I decided to study larger taxonomic units. In a recent contribution I discussed the taxa belonging to the family Galumnidae (Mahunka, 1995a). Herein I propose a survey of the Sabah species belonging to the superfamily Otocephoidea Balogh, 1972 which was earlier excellently elaborated in different ways by Grandjean (1964), Aoki (1965, 1967), Hammer (1971, 1979) and Wallwork (1962a, 1962b). The material examined yielded 32 species, of which 21 are new to science.

After the present studies, I am not sure if the present classification of Otocephidae Balogh, 1961 is correct or if further studies are necessary to improve it. Some genera of Otocephinae (e.g. *Acrotochepeus* Aoki, 1965, *Megalotochepeus* Aoki, 1965 and *Otochepeus* Berlese, 1916) are only distinguishable by the presence or absence of prodorsal or notogastral condyles. The other main diagnostic features, such as length, size and position (in relation to the rostral setae) of the lateral lamelliform expansion and the tutorium, are very variable. Therefore all Otocephinae species mentioned in this paper are provisionally placed in the genus *Otochepeus* Berlese, 1904.

Details about the origin of the material examined have already been given and the general goal of my work has also been outlined in my earlier publications (e.g. Mahunka, 1995b). Descriptions and the terminology in this contribution follow those adopted in my previous papers.

LIST OF LOCALITIES

- Sab-82/4: MALAISIE: **Sabah** (Sandakan Residency): 15 milles (24 km) W de Sandakan: Sepilok: "Kabili-Sepilok Forest Reserve", forêt près "Orang-Utan Rehabilitation Station", prélèvement de sol dans les angles formés par les contreforts ailés de grands arbres (Dipterocarpaceae), 30m; 23.IV.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/5: MALAISIE: **Sabah** (Sandakan Residency): 15 milles (24 km) W de Sandakan: Sepilok: "Kabili-Sepilok Forest Reserve", forêt près "Orang-Utan Rehabilitation Station", prélèvement de bois pourri. Lowland Dipterocarp Forest. 30m; 23.IV.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/15: MALAISIE: **Sabah** (West Coast Residency): Mt Kinabalu: "Bukit Ular Trail" (sentier reliant "Kambarangan Road" à "Power Station"), tamisage de feuilles mortes et de bois pourri, forêt de *Lithocarpus-Castanopsis*; 1790m; 28.IV.1982; leg. B. Hauser – (appareil Winkler-Moczarski à Sepilok).
- Sab-82/16: MALAISIE: **Sabah** (West Coast Residency): Mt Kinabalu: "Bukit Ular Trail" (sentier reliant "Kambarangan Road" à "Power Station"), prélèvement de feuilles mortes, forêt de *Lithocarpus-Castanopsis*; 1850m; 28.IV.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/23: MALAISIE: **Sabah** (West Coast Residency): Mt Kinabalu: "Summit Trail" (sentier reliant "Power Station" au sommet), forêt brumeuse, prélèvement de sol au pied de plusieurs arbres, 2480m; 30.IV.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/27: MALAISIE: **Sabah** (Sandakan Residency): 15 milles (24 km) W de Sandakan: Sepilok: "Kabili-Sepilok Forest Reserve", forêt près "Orang-Utan Rehabilitation Station", tamisage de feuilles mortes et de bois pourri prélevés dans les angles formés par les contreforts ailés de grands arbres, Lowland Dipterocarp Forest, 30m; 3.V.1982; leg. B. Hauser – (appareil Winkler-Moczarski à Sepilok).
- Sab-82/34: MALAISIE: **Sabah** (Sandakan Residency): 15 milles (24 km) W de Sandakan: Sepilok: "Kabili-Sepilok Forest Reserve", forêt près "Orang-Utan Rehabilitation Station", sentier menant vers la mangrove, prélèvement de sol dans le pré autour du "Cottage" (ancienne plantation d'hévéas); 7.V.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/41: MALAISIE: **Sabah** (Sandakan Residency): 15 milles (24 km) W de Sandakan: Sepilok: "Kabili-Sepilok Forest Reserve", forêt près du "Pond" (étang formant la réserve d'eau pour Sepilok), prélèvement de feuilles mortes, Secondary Lowland Forest; 10.V.1982; leg. B. Hauser – (appareil Berlese à Sepilok).
- Sab-82/45: MALAISIE: **Sabah** (Interior Residency): route de Kimanis, à 16 milles de Keningau: hélicoptère, prélèvement de feuilles mortes, forêt brumeuse, 1380m; 12.V.1982; leg. B. Hauser – (appareil Berlese à Genève, Suisse).
- Sab-82/50: MALAISIE: **Sabah** (Interior Residency): route de Kimanis, à 10 milles de Keningau: prélèvement de sol dans les angles formés par les contreforts ailés d'un arbre mort, 1170m; 13.V.1982; leg. B. Hauser – (appareil Berlese à Genève, Suisse).

LIST OF IDENTIFIED SPECIES

Dampfiellidae Balogh, 1961

Dampfiella kinabalu sp. n.

Locality: Sab-82/15.

- Dampfiella nebulosa* sp. n.
Locality: Sab-82/23.
- Dampfiella sepilok* sp. n.
Locality: Sab-82/41.

Otocepheidae Balogh, 1961

- Archegotocephens singularis* Mahunka, 1988
Localities: Sab-82/27: 7 specimens; Sab-82/41: 5 specimens.
Distribution: Sabah (known from the type localities only); second record.
- Borneremaens hauseri* Mahunka, 1991
Locality: Sab-82/15: 16 specimens.
Distribution: Sabah (known from the type locality only); second record.
- Bulbocephens hanserorum* Mahunka, 1988
Locality: Sab-82/43: 15 specimens.
Distribution: Sabah (known from the type locality only); second record.
- Dolicheremaens brmeiensis* Aoki, 1967
Localities: Sab-82/4: 5 specimens; Sab-82/5: 2 specimens; Sab-82/41: 2 specimens.
Distribution: Brunei (Aoki, 1967), Sabah (Mahunka, 1991); second record for Sabah.
- Dolicheremaens cicatrchosns* Mahunka, 1991
Localities: Sab-82/27: 4 specimens; Sab-82/43: 3 specimens.
Distribution: Sabah (known from the type locality only); second record.
- Dolicheremaens claviger* sp. n.
Locality: Sab-82/15.
- Dolicheremaens fujikawae* sp. n.
Localities: Sab-82/15; Sab-82/16; Sab-82/27.
- Dolicheremaens krantzi* sp. n.
Localities: Sab-82/4; Sab-82/15; Sab-82/16; Sab-82/43; Sab-82/45; Sab-82/50.
- Dolicheremaens luxtoni* sp. n.
Locality: Sab-82/50.
- Dolicheremaens punctatus* sp. n.
Locality: Sab-82/15.
- Dolicheremaens sabahinus* Mahunka, 1988
Localities: Sab-82/27: 8 specimens; Sab-82/41: 3 specimens; Sab-82/50: 1 specimen.
Distribution: Sabah (known from the type localities only); second record.
- Dolicheremaens sulcatus* sp. n.
Locality: Sab-82/4.
- Dolicheremaens yoshii* sp. n.
Locality: Sab-82/4.
- Ikarotocephus alatus* Mahunka, 1988
Localities: Sab-82/43: 2 specimens.
Distribution: Sabah (known from the type locality only); second record.
- Leptocephus orientalis* Mahunka, 1988
Localities: Sab-82/4: 7 specimens; Sab-82/5: 1 specimen; Sab-82/27: 5 specimens; Sab-82/34: 2 specimens; Sab-82/41: 17 specimens; Sab-82/43: 21 specimens; Sab-82/45: 2 specimens.
Distribution: Sabah (known from the type locality only); second record.
- Otocephus bajau* sp. n.
Locality: Sab-82/4: 6 specimens.
- Otocephus berndhauseri* sp. n.
Locality: Sab-82/15.

Otocephus burckhardti (Mahunka, 1987a)

Localities: Sab-82/27: 3 specimens; Sab-82/41: 8 specimens.

Distribution: Sabah (known from the type locality only); second record.

Otocephus heterosetiger (Aoki, 1965)

Localities: Sab-82/27: 1 specimen; Sab-82/41: 1 specimen.

Distribution: Thailand; first record for Sabah.

Otocephus kadazan sp. n.

Locality: Sab-82/15.

Otocephus kenangan sp. n.

Locality: Sab-82/43.

Otocephus lienhardorum sp. n.

Localities: Sab-82/15; Sab-82/16.

Otocephus nepenthes sp. n.

Locality: Sab-82/34.

Otocephus orangutan sp. n.

Locality: Sab-82/27.

Otocephus philippinensis Aoki, 1965

Localities: Sab-82/27: 2 specimens; Sab-82/50: 4 specimens.

Distribution: Philippines; first record for Sabah.

Otocephus rafflesiae sp. n.

Locality: Sab-82/27.

Otocephus reniformis sp. n.

Locality: Sab-82/15.

Otocephus spatulatus sp. n.

Locality: Sab-82/50.

Otocephus verrucosus sp. n.

Locality: Sab-82/15.

DESCRIPTIONS AND REMARKS

Dampfiella kinabalu sp. n.

Figs 1-10

Material examined: Sabah: Holotype: Sab-82/15, 50 paratypes from the same sample. Holotype and 30 paratypes: MHNG¹; 20 paratypes (1498-PO-94): HNHM².

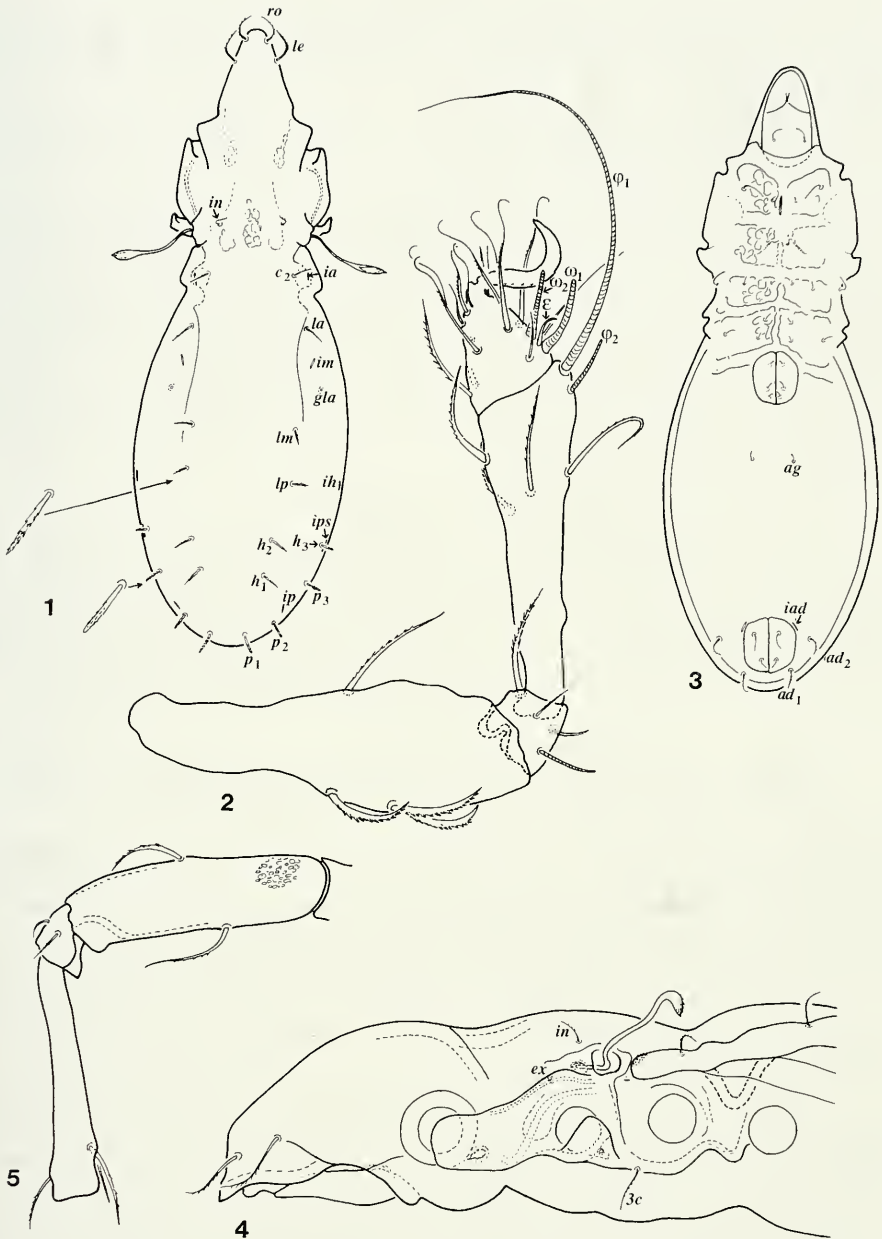
Measurements: Length of body: 458-667 μm ; width of body: 180-250 μm .

Prodorsum: Rostrum wide, rostral setae simply arched, shorter than the geniculate lamellar ones, all finely ciliate. Interlamellar setae shorter, exobothridial setae minute or represented only by their alveoli, arising very close to the bothridium. Sensillus (Fig. 9) comparatively long, with a well developed apex (often broken) and some small spicules on its surface. The median spots and other irregular sculptures of the prodorsum - typical for this genus - conspicuous (Fig. 6). Taenidia also clearly visible.

Notogaster: Narrow, humeral apophysis well developed, with cerotegument granules. Anterolateral "cuvette" very deep. Ten pairs of short notogastral setae. 5

¹ MHNG: deposited in the Muséum d'histoire naturelle, Geneva.

² HNHM: deposited in the Hungarian Natural History Museum, Budapest, with identification-number of the specimens in the Collection of Arachnida.



FIGS 1-5

Dampfiella kinabalu sp. n. — 1: body in dorsal aspect, 2: leg I, 3: body in ventral aspect, 4: podosoma in lateral aspect, 5: femur, genu and tibia of leg IV.

pairs of lyrifissures and the glandular opening visible. All notogastral setae nearly equal in size, distinctly spiculate (Fig. 1), the anterior and median setae sharply pointed, 4 pairs in posteromarginal position being as long as the others but blunt at the tip and bacilliform.

Lateral part of podosoma: Pedotecta I very large, pedotecta II-III triangular, discidium rounded, as shown in Fig. 4.

Ventral region (Fig. 3): Coxisternal region well sculptured, and the epimeral borders clearly developed. Epimeral setal formula: 2(3) - 1 - 3 - 3. Excepting the setae *1b*, all setae short. or minute. Setae *1c* completely reduced or represented only by their alveoli. Setae *4c* standing conspicuously far from the discidium, distance between setae *3a* only slightly shorter than that between setae *3b*. Anogenital setal formula : 3 - 1 - 2 - 2. Aggenital setae very short, anterior anal setae (*an*₂) somewhat longer than the posterior ones (*an*₁) and arising further from each other than the posterior ones. Setae *ad*₃ absent. Lyrifissures *iad* hardly discernible, located near to the anterior corner of the anal aperture.

Gnathosoma: Labiogenal articulation conspicuous, mentum long (Fig. 7). Chelicera (Fig. 8) normal, both digits well developed.

Legs: All femora ornamented by foveolae, one of the crests on their distal end clearly visible. All femora broadly, and all genua narrowly excavated basally, the inner pointed apices on genua III and IV sharply pointed (Fig. 4), the lateral ones rounded. All claws with 6-7 small dorsal teeth, on tarsi I-II absent. On tarsus I setae *p'*, *p''* and *s* eupathidial, the others of normal type (Fig. 2). Leg setal formulae are:

I: 1 - 4 - 3+1 - 4+2 - 16+2 - 1

IV: 1 - 1 - 2 - 3 - 12 - 1

Remarks: See the remarks after the following *Dampfiella* species.

Derivatio nominis: Named after the Mt Kinabalu National Park.

Dampfiella nebulosa sp. n.

Figs 11-13

Material examined: Sabah: Holotype: Sab-82/23, 3 paratypes from the same sample. Holotype and 2 paratypes: MHNG; 1 paratype (1949-PO-94): HNHM.

Measurements: Length of body: 556-667 µm; width of body: 208-278 µm.

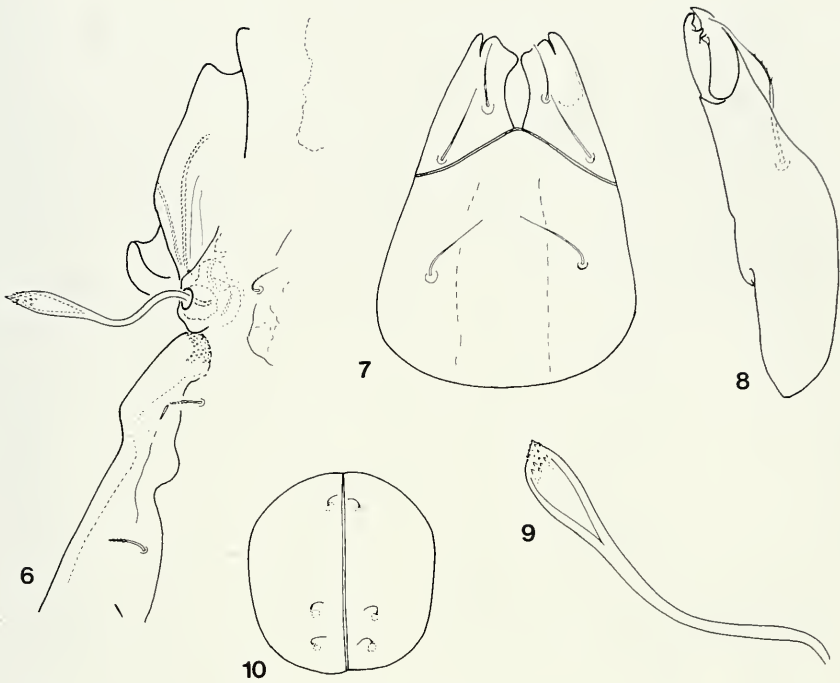
Prodorsum: Very similar to the preceding species, but the sensillus (Fig. 12) slightly thicker, without a sharply pointed apex, bearing some small spines of equal size on its distal margin.

Notogaster: Broader than in the preceding species, but the position of the setae is quite similar. Ten pairs of notogastral setae well developed, six of them thicker and longer than the four other bacilliform ones which are present in the posteromarginal position (Fig. 11).

Ventral region (Fig 13): Coxisternal region well sculptured, epimeral borders conspicuous. Epimeral setal formula: 2 - 1 - 3 - 3, the insertions of setae *1c* were not discernible. Setae *1b* longest of all, but some setae (e.g. *4a* and *4b*) much longer than in the preceding species.

Legs: Similar to those of the preceding species.

Remarks: The family Dampfiellidae Balogh, 1961, with its two genera *Dampfiella* Sellnick, 1931 and *Beckiella* Grandjean, 1964, is rather inadequately known, as



FIGS 6-10

Dampfiella kinabalu sp. n. – 6: lateral part of body in dorsal aspect, 7: gnathosoma, 8: chelicera, 9: sensillus, 10: genital plates.

has been pointed out by Hammer (1979) and also by Pérez-Iñigo & Baggio (1986). The two new species (*D. kinabalu* and *D. nebulosa*) readily distinguishable by the shape of their notogastral setae should be grouped with *D. angusta*. In this respect *D. angusta* is closer to *D. kinabalu*, though its sensillus is smooth and much longer and narrower than that of the two new species. Furthermore, its rostrum is more angular in dorsal view.

Derivatio nominis: An allusion to the cloud-forest of Mt. Kinabalu, where the type material was collected.

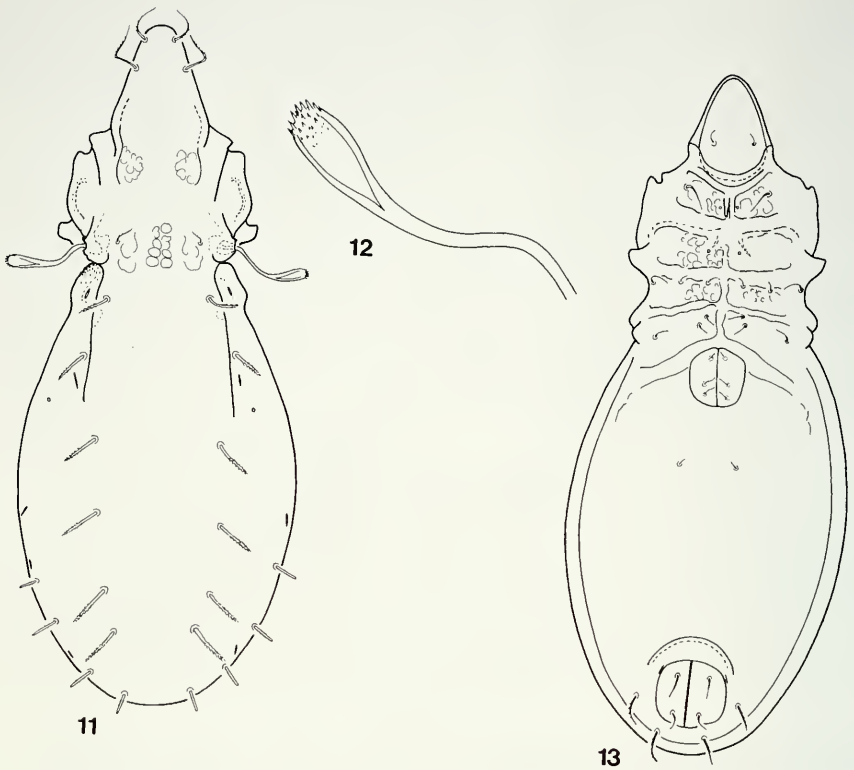
***Dampfiella sepilok* sp. n.**

Figs 14-17

Material examined: Sabah: Holotype: Sab-82/41, 3 paratypes from the same sample. Holotype and 2 paratypes: MHNG; 1 paratype (1950-PO-94): HNHM.

Measurements: Length of body: 501-610 μm ; width of body: 138-207 μm .

Prodorsum: Similar to the preceding species, but slightly longer. Rostral apex weakly foveolate. Rostral and lamellar setae simply arched, unilaterally ciliate. Interlamellar setae short, setiform, exobothridial setae reduced, represented only by their alveoli. Sensillus long, its head clavate, wide, with a small apex and some spicules on its distal end.



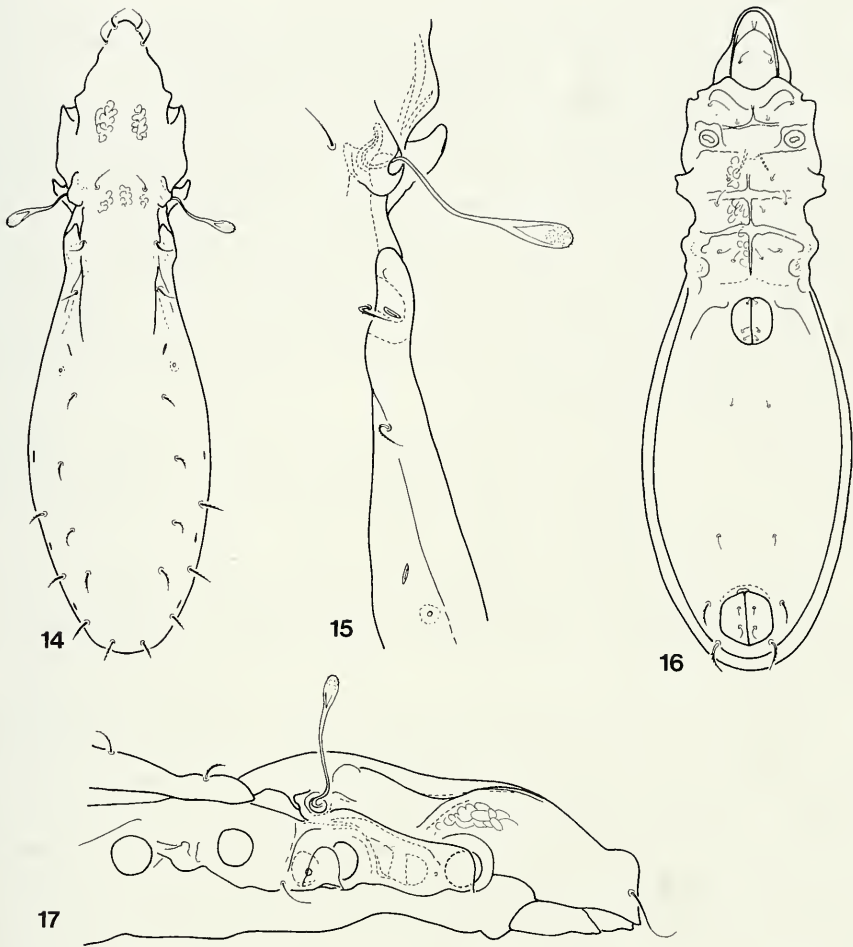
FIGS 11-13

Dampfiella nebulosa sp. n. – 11: body in dorsal aspect, 12: sensillus, 13: body in ventral aspect.

Notogaster: Extremely long and narrow. A well defined neck-region observable (Fig. 14). Between the bothridial and the lateral condyles of the notogaster an intercondylar band visible (Fig. 15). Anterolateral cuvette small and not deep. Ten pairs of notogastral setae present, all blunt at tip and distinctly spiculate unilaterally. The distance between setae c_2 and la much smaller than that between la and lm . The median notogastral setae gradually becoming longer posteriorly, setae h_1 being the longest of all. All four pairs of setae in posteromarginal position are of equal length.

Lateral part of podosoma: Pedotecta I very large (Fig. 17). The extreme length of the body also reflected in the neck-region.

Ventral region (Fig. 16): Ventral cuvette very large, strongly bordered, epimeres I and II larger than normal. Behind the discidium a pair of deep hollows present. Epimeral setal formula: 3 - 1 - 2 - 2 (setae $4c$ near the discidium not discernible). Epimeral setae, excepting setae $1b$, very short, sometimes hardly observable. Genital and aggenital setae also very short, anal setae normal and adanal ones conspicuously long, setae ad_1 being the longest of all notogastral and ventral setae, thickened and spiculate like the posterior notogastral setae.



FIGS 14-17

Dampfiella sepilok sp. n. – 14: body in dorsal aspect, 15: lateral part of body in ventral aspect, 16: body in ventral aspect, 17: podosoma in lateral aspect.

Legs: All femora strongly foveolate, appearing to be polygonate. The protruding plates on genua II-IV are rounded.

Remarks: On the basis of the 3 pairs of adanal setae, this species belongs to another species group than the two preceding ones. It is well characterised by the shape of the notogastral and ventral setae and primarily by the extremely elongated body with a narrow neck-part. On this basis this species may easily be distinguished from all heretofore known taxa.

Derivatio nominis: The species is named after the region of Sepilok, where its type locality is situated.

Dolicheremaeus claviger sp. n.

Figs 18-22

Material examined: Sabah: Holotype: Sab-82/15, 2 paratypes from the same sample. Holotype and 1 paratype: MHNG; 1 paratype (1953-PO-94): HNHM.

Measurements: Length of body: 820-876 μm ; width of body: 319-362 μm .

Prodorsum: Rostrum wide, foveolate. Lamellae narrow, long, medially arching outwards (Fig. 18). Interlamellar region with strong sculpture consisting of foveolae of different sizes. Both pairs of prodorsal condyles well developed, rounded and slightly larger than the lateral ones. Tutorium sinuate and arched, not directed toward the insertion of rostral setae. Lateral lamelliform expansions straight, not touching each other. Rostral and lamellar setae setiform, lamellar setae clearly longest (Fig. 18). Interlamellar setae ensiform, straight, the much shorter and thinner exobothridial setae erect, all setae ciliate or spiculate. Sensillus (Fig. 21) short, its head clavate, with some minor spicules on its distal end.

Notogaster: Its surface characteristically foveolate, ornamented by larger foveolae anteriorly and by smaller ones posteriorly (Fig. 18). Ten pairs of ensiform (needle-like), mostly straight notogastral setae present, they are spiculate or finely roughened. No great differences among them, but setae p_1 clearly shorter than p_2 , setae c_2 shorter than interlamellar setae.

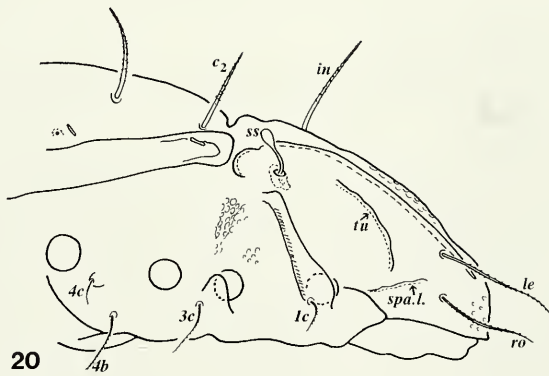
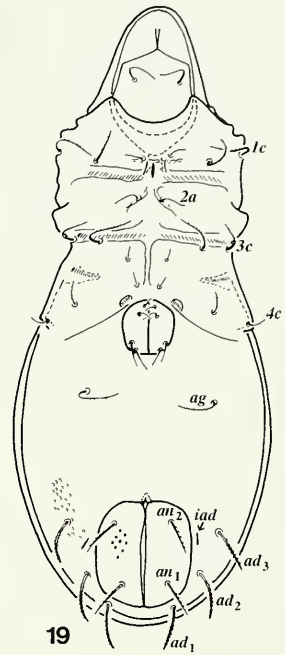
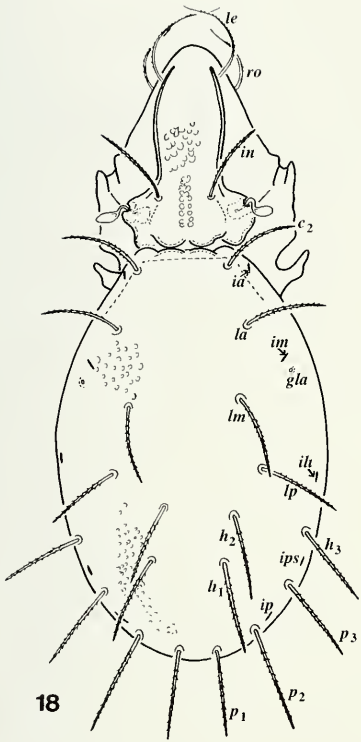
Lateral part of podosoma: Pedotecta I narrow, pedotecta II-III small, their shape typical for the genus. Sejugal region stronger, surface between the pedotecta I and II-III slightly foveolate. Discidium small. Setae $1c$ arising at the basis of pedotecta I (Fig. 20).

Ventral region: The shape of the apodemes and the epimeral borders typical for the genus, with a weak sculpture. The posterior border of this region (*bo.* 4) thin, like a tectum, but conspicuous. Great differences exist among the epimeral setae, they are longer on epimeres I and II than on epimeres III and IV. Setae $1b$, $1c$, $3b$ long, setae $4c$ particularly short, their size and ratio are shown in Fig. 19. All setae strongly pilose. Ventral plate rarely foveolate. A pair of well sclerotized short laths observable at the anterior corner of the genital aperture. Anterior two pairs of genital setae short, posterior two pairs long. These and the aggenital setae are fine, setiform, adanal ones blunt at tip, similar to notogastral ones. Setae ad_3 located closer to the anal aperture than to the lateral margin of the ventral plate. Lyrifissures *iad* in inverse apoaanal position.

Legs: All tarsi with dorsal teeth, claws are spiculate dorsally. Type of ultimate setae: L - ? - ? - S. Setae *v*"of tibia and *pv*"of tarsus plumose.

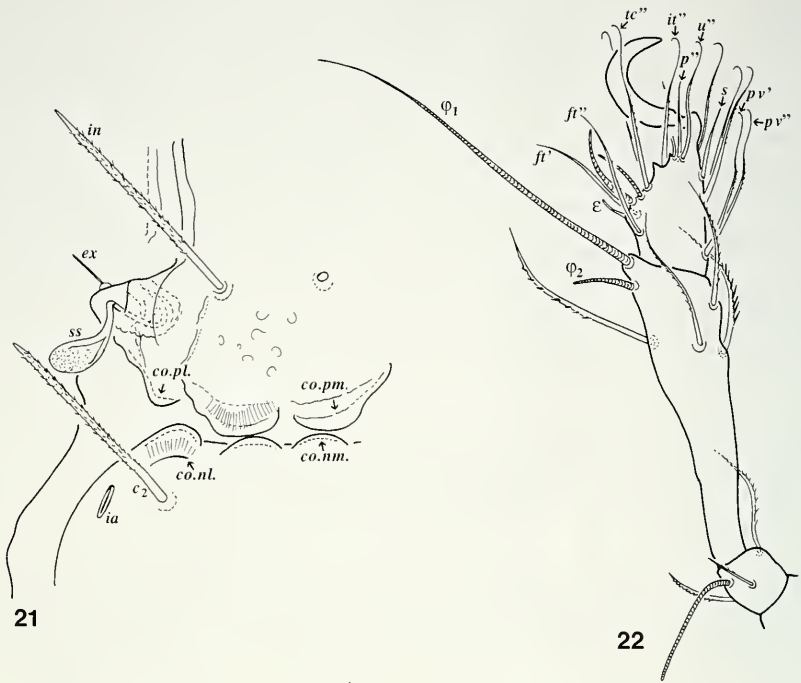
Remarks: The new species is characterised by the great differences among the genital setae and the form of the very short, clavate sensillus, by its characteristic notogastral sculpture, the form of its lateral condyles and the form of its notogastral setae. On this basis it may be distinguished from all the heretofore known *Dolicheremaeus* species.

Derivatio nominis: The species is named after the form of its sensillus.



FIGS 18-20

Dolicheremaeus claviger sp. n. – 18: body in dorsal aspect, 19: body in ventral aspect, 20: podosoma in lateral aspect.



FIGS 21-22

Dolicheremaeus claviger sp. n. – 21: sensillus and the lateral condyles, 22: leg I.

Dolicheremaeus fujikawae sp. n.

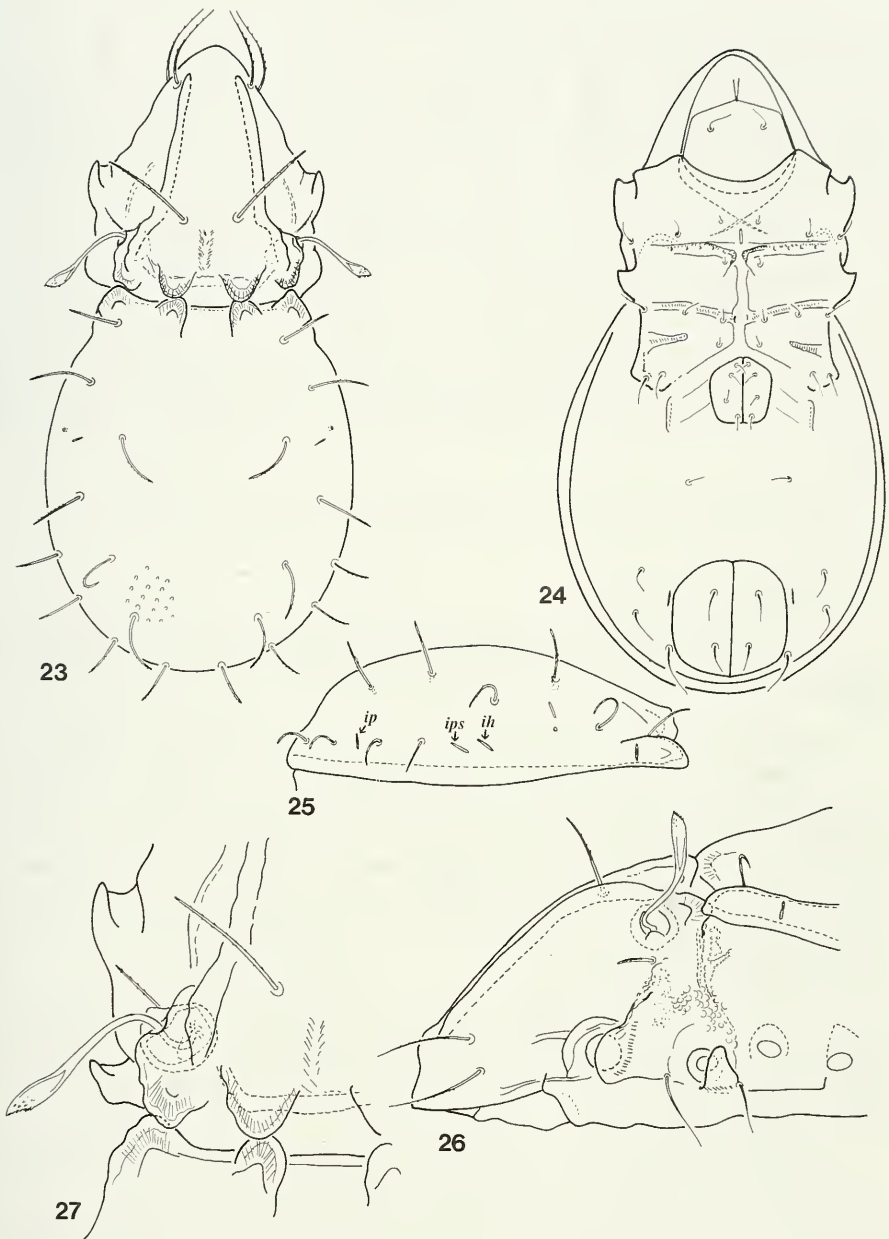
FIGS 23-27

Material examined: Sabah: Holotype: Sab-82/15, 1 paratype from the same sample; 1 paratype: Sab-82/16; 2 paratypes: Sab-82/27. Holotype and 2 paratypes: MHNG; 2 paratypes (1960-PO-94); HNHM.

Measurements: Length of body: 331 μm ; width of body: 180 μm .

Prodorsum: Lamellae long, gradually converging anteriorly, reaching beyond the insertion of the lamellar setae but not touching them. Surface weakly ornamented, but covered by cerotegument granules. Tutorium hardly discernible, lateral lamelli-form expansion short, straight. Both pairs of median condyles very large, median one more rounded, lateral one slightly angulate (Fig. 27). Under the median condyles a transversal band observable in a deeper layer. Rostral and lamellar setae long, setiform, weakly ciliate. Interbothridial and exobothridial setae bacilliform, blunt at tip, their surface only slightly roughened. Head of sensillus asymmetrically dilated, with short spines or spicules on its distal end.

Notogaster: Surface rarely foveolate. Both pairs of notogastral condyles conspicuously large. Ten pairs of short and mostly bacilliform notogastral setae present, they are nearly equal in size and length (Fig. 23), their surface slightly roughened. Five pairs of conspicuous lyrifissures, *ih* and *ips* located anteriorly to seta h_3 (Fig. 25).



FIGS 23-27

Dolicheremaeus fujikawae sp. n. – 23: body in dorsal aspect, 24: body in ventral aspect, 25: notogaster in lateral aspect, 26: podosoma in lateral aspect, 27: lateral part of the dorsosejugal region.

Lateral part of podosoma: Pedotecta II-III well, discidium hardly developed. Sejugal region distinctly pustulate (Fig. 26).

Ventral region: Coxisternal and ventral plates somewhat sculptured, the apodema and the epimeral borders mostly observable. *Bo.* 4 only partly visible, interrupted. A well-developed longitudinal lath parallel with the genital aperture present. All setae in the ventral regions short and simple (Fig. 24), anal setae longer than the longest epimeral ones. Lyrifissures *iad* in paraanal position.

Legs: Tarsus of leg I without triangular teeth. Type of ultimate setae: L - L - L - L, but these setae (*u*) very short and fine. No dilated setae on tibia IV and tarsus IV.

Remarks: The new species is well characterised by the form of its sensillus, the position of the notogastral lyrifissures (*ih* and *ips*) and the short notogastral setae of equal length. On this basis it belongs to the species group of *D. variolatus* Mahunka, 1989. The new species may be distinguished from the latter by its peculiarly large condyles on the prodorsum and on the notogaster, and by the much shorter adanal setae.

Derivatio nominis: I dedicate the new species to Dr. T. Fujikawa, the renowned Oribatidologist, for her excellent studies on the Japanese oribatids.

Dolicheremaeus krantzi sp. n.

Figs 28-31

Material examined: Sabah: Holotype: Sab-82/15, 10 paratypes from the same sample; 3 paratypes: Sab-82/4; 2 paratypes: Sab-82/16; 9 paratypes: Sab-82/43; 1 paratype: Sab-82/45; 3 paratypes: Sab-82/50. Holotype and 17 paratypes: MHNG; 11 paratypes (1952-PO-94): HHNM.

Measurements: Length of body: 457-512 μm ; width of body: 226-294 μm .

Prodorsum: Rostrum widely rounded, lamellae long, slightly and gradually converging anteriorly. Prodorsal surface mostly smooth, with some large foveolae and wrinkles along the lamellae in the interlamellar region. Median prodorsal condyles distinct, the lateral ones weakly developed (Fig. 30). Rostral and lamellar setae setiform, both distinctly ciliated. Interlamellar setae ensiform and exobothridial setae needle-shaped, surface of the former smooth, the latter strongly spiculate. Sensillus long, with slightly lanceolate head.

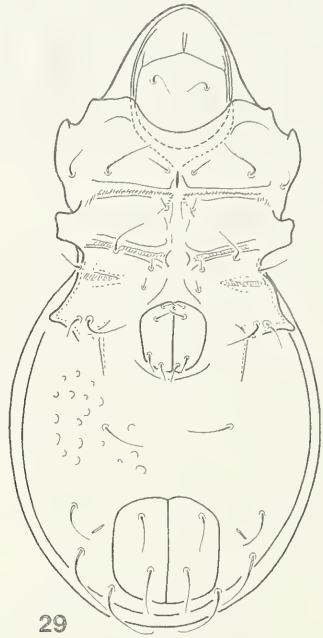
Notogaster: Whole surface covered by large, partly rounded, partly elongated pustules with a medial split. Notogastral condyles well developed, median pair rounded, lateral ones triangular. Great differences in length among notogastral setae. Setae *c*₂ and *h*₃ short, bacilliform, all others setiform or filiform, much longer than the preceding two pairs (Fig. 28).

Lateral part of podosoma: Pedotecta I normal, pedotecta II-III well developed. Discidium with a conspicuously protruding posterior corner (Fig. 31).

Ventral region (Fig. 29): Among the apodemes *ap.* 2, *ap. sej.* and *ap.* 3 distinct, *ap.* 4 weakly developed, *bo.* 4 only partly observable. Far laterally along the genital aperture a longitudinal crest present. Epimeral setal formula normal (3 - 1 - 3 - 3), setae *1b*, *3b* and *4b* longer than the others. Ventral plate foveolate. Aggenital, anal and adanal setae fine, shorter than most of the notogastral ones. Lyrifissures *iad* in inverse apoanal position.



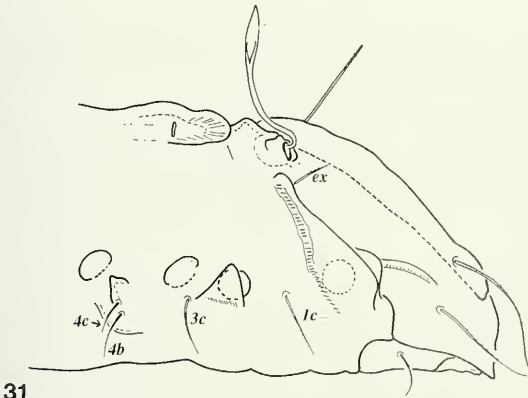
28



29



30



31

FIGS 28-31

Dolicheremaeus krantzi sp. n. – 28: body in dorsal aspect, 29: body in ventral aspect, 30: lateral part of the dorsosejugal region, 31: podosoma in lateral aspect.

Legs: Tarsus of leg I without triangular teeth. Type of ultimate setae: L - L - L - L. Setae *pv*" of tibia and *v*" of tarsus plumose.

Remarks: The new species is well characterised and well distinguished from all heretofore known *Dolicheremaeus* species by its characteristic sculpture on the notogaster and the form of its notogastral setae.

Derivatio nominis: I dedicate the new species to Prof. Dr. W. Krantz (Corvallis, USA), an acarologist of great renown.

***Dolicheremaeus luxtoni* sp. n.**

Figs 32-35

Material examined: Sabah: Holotype: Sab-82/50. 8 paratypes from the same sample. Holotype and 5 paratypes: MHNG; 3 paratypes (1966-PO-94): HHNM.

Measurements: Length of body: 583-738 μm ; width of body: 264-390 μm .

Prodorsum: Rostrum smooth. Lamellae very long and narrow, running parallel to each other. Only one pair of notogastral condyles present; the median one completely lacking, whereas the lateral one enlarged and very wide (Fig. 34). Tutorium hardly developed, the lateral lamelliform expansion clearly developed, directed toward the insertion of rostral setae but not reaching it (Fig. 35). Rostral and lamellar setae setiform, strongly ciliate. Interlamellar setae ensiform. Sensillus with asymmetrically dilated head, its distal end bearing some spicules. Exobothridial setae straight, short.

Notogaster: Its surface ornamented mostly by foveolae, but posterior part clearly pustulate. Two pairs of large notogastral condyles present, *co. ul.* and *co. um.* located conspicuously near to each other (Fig. 32), the median one is elongated. All ten pairs of notogastral setae ensiform, no great differences in length and size among them. Lyrifissures *ips* open between setae *p*₃ and *h*₃.

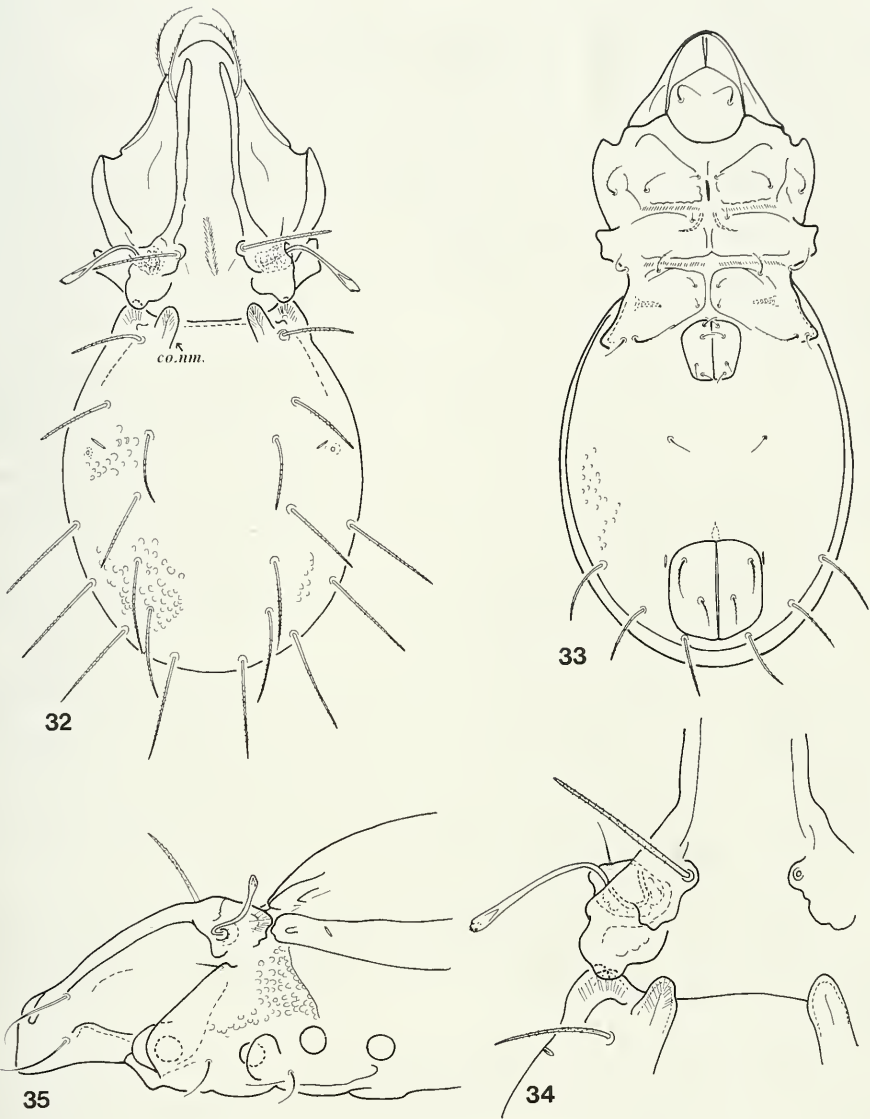
Lateral part of podosoma: All pedotecta normal in shape, as shown in Fig. 35. Sejugal region well pustulate.

Ventral region (Fig. 33): Epimeral borders and the usual apodemes conspicuous. Epimeral setae short, no obvious differences among setae *1b*, *1c*, *3b*, *3c*. Setae *4b* the longest of all, setae *1a*, *2a*, *3a* and *4a* very short. Ventral plate foveolate, surface of genital and anal plates smooth. Genital and aggenital setae short and simple, anal ones and especially adanal ones much longer and stronger. Setae *ad*₃ arising far laterally, near to the margin of ventral plate. All setae slightly aciculate. Lyrifissures *iad* in adanal position.

Legs: Type of ultimate setae: L - S - S - S. No triangular teeth on tarsi I-IV. Seta *v*" on tibia and *pv*" on tarsus plumose.

Remarks: Owing to the absence of the median prodorsal condyles and the position of adanal setae and lyrifissures, the new species strongly resembles *D. baloghi* Aoki, 1967. However, the latter is well distinguished from the new species by the sculpture of the notogaster (the posterior part also foveolate) and by the length of the interlamellar setae (short in *D. baloghi*). The form of the notogastral condyles also differs.

Derivatio nominis: I dedicate the new species to Dr. M. Luxton, the renowned specialist of the world oribatids, as a grateful acknowledgement of his valuable help in the revision of my manuscripts.



FIGS 32-35

Dolicheremaeus luxtoni sp. n. — 32: body in dorsal aspect, 33: body in ventral aspect, 34: dorsosejugal region, 35: podosoma in lateral aspect.

Dolicheremaeus punctatus sp. n.

Figs 36-39

Material examined: Sabah: Holotype: Sab-82/15, 23 paratypes from the same sample. Holotype and 14 paratypes: MHNG; 9 paratypes (1954-PO-94): HNHM.

Measurements: Length of body: 847-1279 μm ; width of body: 389-667 μm .

Prodorsum: Rostrum slightly foveolate, prodorsal surface simple, only the exobothridial and sejugal region strongly pustulate laterally. Lamellae long and narrow, slightly bent inwards distally. Two pairs of prodorsal condyles present, median one regularly rounded and much larger than the slightly angulate lateral pair (Fig. 37). Rostral and lamellar setae arising relatively near to each other, both pairs setiform and strongly ciliate, with filiform distal end. Interlamellar setae ensiform, straight, slightly spiculate. Exobothridial setae short, sensillus with a slightly dilated lanceolate head.

Notogaster: Ornamented with small but deep, well-framed foveolae (nearly punctate). Two pairs of notogastral condyles present, but the median pairs weakly developed, not reaching beyond the dorsosejugal suture (Fig. 36). The lateral condyles triangular in shape. Ten pairs of notogastral setae present, all ensiform, similar to the interlamellar ones, without essential difference between them. Lyrifissures *ih* and *ips* located in front of setae *h*₃.

Lateral part of podosoma: Pedotecta I and II-III normal, discidium small (Fig. 39). Tutorium long, well arched, undulate dorsally, not connected with the also long and reversed S-shaped lateral lamelliform expansion.

Ventral region (Fig. 38): Epimeral surface rarely, ventral plate distinctly foveolate, similar to the notogastral surface. Epimeral setae relatively long, setae *1c* arising anteriorly, setae *4b* and *4c* located far from each other. All setae, excepting the adanal ones, in the anogenital region (e.g. genital ones) unusually long, setiform. Adanal setae ensiform like the notogastral setae, shorter than the anal setae. Setae *ad*₁ slightly longer than *ad*₃, the former arising closer to the anal aperture than to the lateral margin. Lyrifissures *iad* in inverse apoanal position.

Legs: Tarsi of all legs bearing sharp teeth. Type of ultimate setae: L - S - S - S.

Remarks: The new species is well characterised by the strong (deep) punctation resembling a foveolate sculpture, by the equal length and size of the notogastral setae and primarily by the ratio of the anogenital setae (i.e. anal setae longer than the adanal ones).

Derivatio nominis: The species is named after the punctate surface of the notogaster.

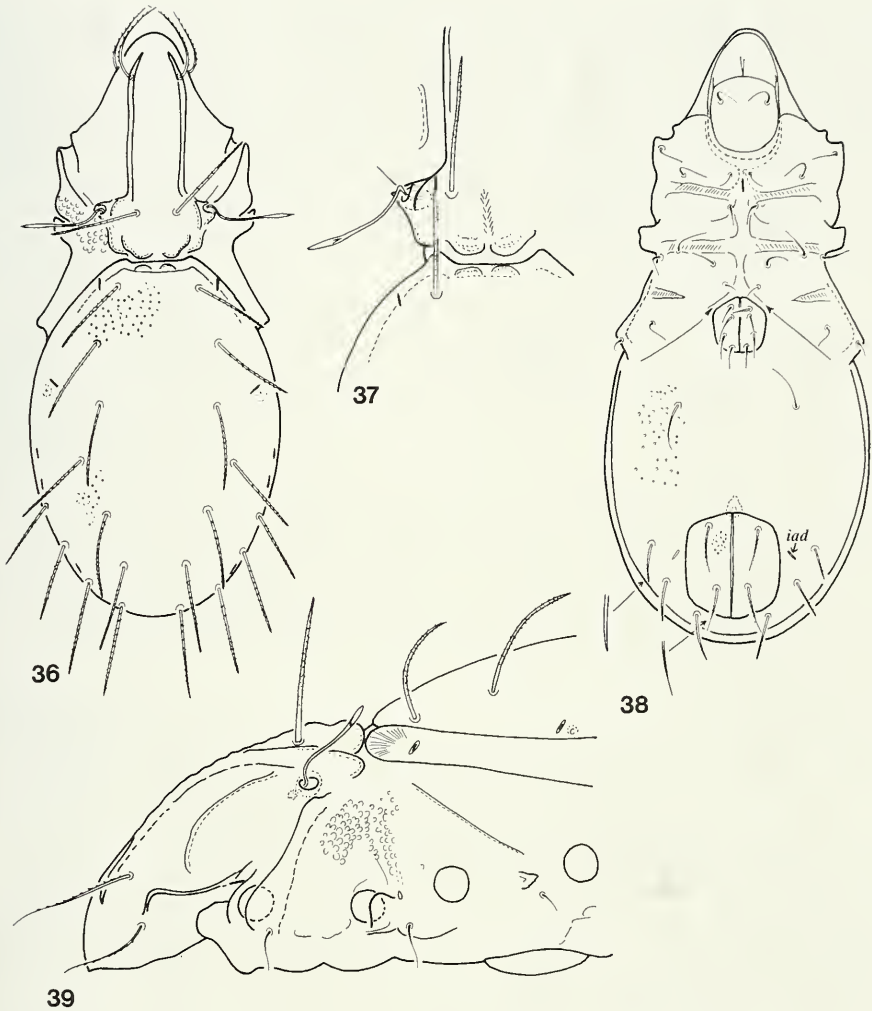
Dolicheremaeus sulcatus sp. n.

Figs 40-47

Material examined: Sabah: Holotype: Sab-82/4, 5 paratypes from the same sample. Holotype and 3 paratypes: MHNG; 2 paratypes (1951-PO-94): HNHM.

Measurements: Length of body: 556-602 μm ; width of body: 272-300 μm .

Prodorsum: Surface smooth, only the surface of pedotecta weakly foveolate and the sejugal region pustulate (Fig. 40). Some very fine interlamellar spots visible, arranged in longitudinal rows. Lamellae very long, with well separated distal part, like



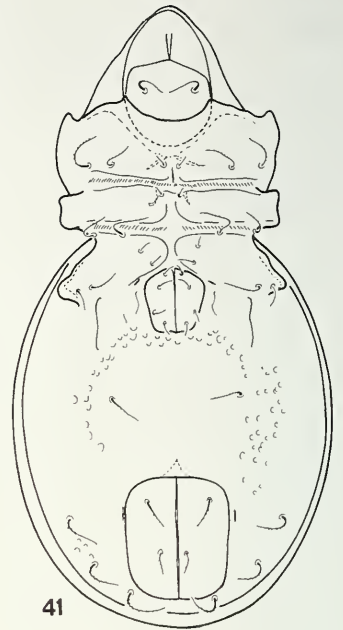
FIGS 36-39

Dolicheremaeus punctatus sp. n. — 36: body in dorsal aspect, 37: dorsosejugal region. 38: body in ventral aspect, 39: podosoma in lateral aspect.

cusps, running parallel to each other. The median prodorsal condyles connected with them, both pairs of condyles very large, the outer ones rectangular, the inner ones triangular (Fig. 42). Lamellar and rostral setae setiform, strongly ciliated. Interlamellar setae ensiform, exobothridial setae arising at the basis of pedotecta I. Tutorium absent, lateral lamelliform expansion well developed.



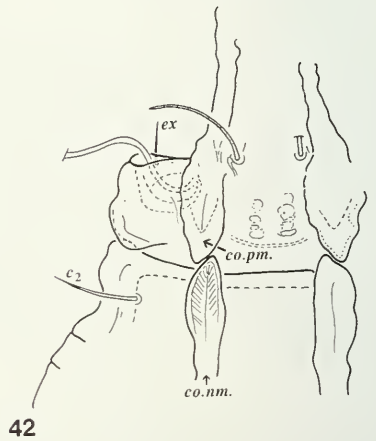
40



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43



42

FIGS 40-43

Dolicheremaeus sulcatus sp. n. — 40: body in dorsal aspect. 41: body in ventral aspect. 42: dorsosejugal region. 43: podosoma in lateral aspect.

Notogaster: Sejugal region wide, two pairs of well-developed condyles present, median pairs conspicuously long (Fig. 40), directed backwards. Anterior and median surface sulcate, alternating with irregular alveoli, behind them is a blister-like structure, and the posterior margin again foveolate and alveolate. Ten pairs of thin and mostly long or very long notogastral setae present, some of them with filiform and flagelliform distal ends. Lyrifissures *im* located far anteriorly, the glandular opening placed rather anteriorly. Lyrifissures *ips* present between setae p_3 and h_3 (Fig 44).

Lateral part of podosoma: Pedotecta I wide, pedotecta II-III rectangular, discidium normal, setae *4b* and *4c* arising close to each other on the apex of the discidium (Fig. 43).

Ventral region (Fig. 41): Transversal apodemes well developed, the two *ap.* 2 and the two *ap. sej.* connected medially. Epimeral setae (3 - 1 - 3 - 3) mostly clearly ciliate. Ventral plate foveolate laterally, a pair of longitudinal wrinkles observable along the genital aperture. Aggenital, anal and adanal setae similar to the notogastral ones, with filiform end.

Legs: Type of ultimate setae: L - L - L - L. No triangular teeth on tarsi I-IV (Figs 45-46). Seta *v*" on tibia and *pv*" on the tarsus plumose.

Remarks: The new species is distinguished from all others hitherto known from the family Otocephelidae Balogh, 1961 by the blister-like structure of the body and by the sculpture of the notogaster.

Derivatio nominis: The species is named after the sulcate surface of the notogaster.

Dolicheremaeus yoshii sp. n.

Figs 48-51

Material examined: Sabah: Holotype: Sab-82/27, 20 paratypes from the same sample. Holotype and 12 paratypes: MHNG; 8 paratypes (1955-PO-94): HNHM.

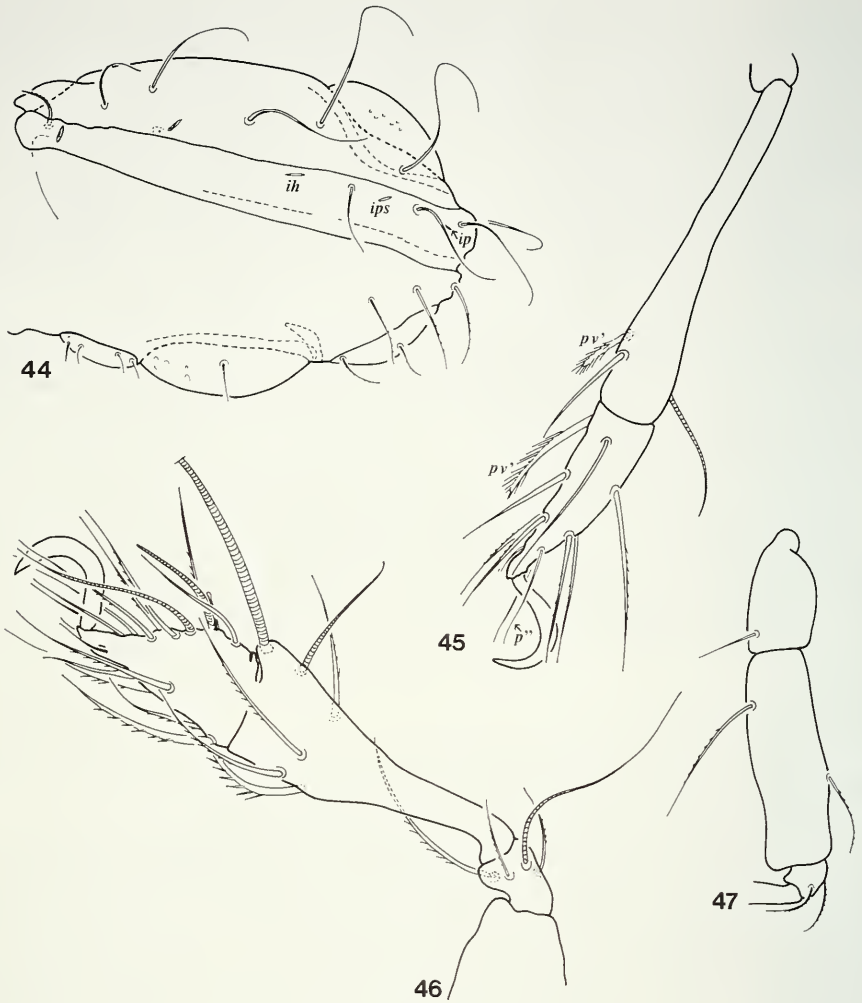
Measurements: Length of body: 792-1070 μm ; width of body: 264-459 μm .

Prodorsum: Rostral apex smooth, slightly excavate medially. Lamellae long, running parallel to each other, their surface foveolate. Basal part of the interlamellar region with some wrinkles. Both pairs of prodorsal condyles large, nearly triangular. Bothridium with a small dorsal, and a very large ventral squama (Fig. 48). Tutorium weak, straight, lateral lamelliform expansion very long, arching upwards, directed rather to the lamellar than the rostral setae and ending between them. Head of sensillus dilate, with a blunt distal end, the latter with some spicules.

Notogaster: Sejugal region wide, with two pairs of notogastral condyles. Lateral ones triangular, median ones asymmetrical, conspicuously long (Fig. 50). Notogastral surface ornamented with very large and irregular foveolae and with some sinuate wrinkles around the median part. Only nine pairs of notogastral setae present (setae c_2 absent), all ensiform, finely ciliate.

Lateral part of podosoma: Pedotecta I normal, pedotecta II-III and the discidium weakly developed. Pedotecta and the sejugal region ornamented with smaller foveolae and a field over the acetabula III-IV with larger ones (Fig. 51).

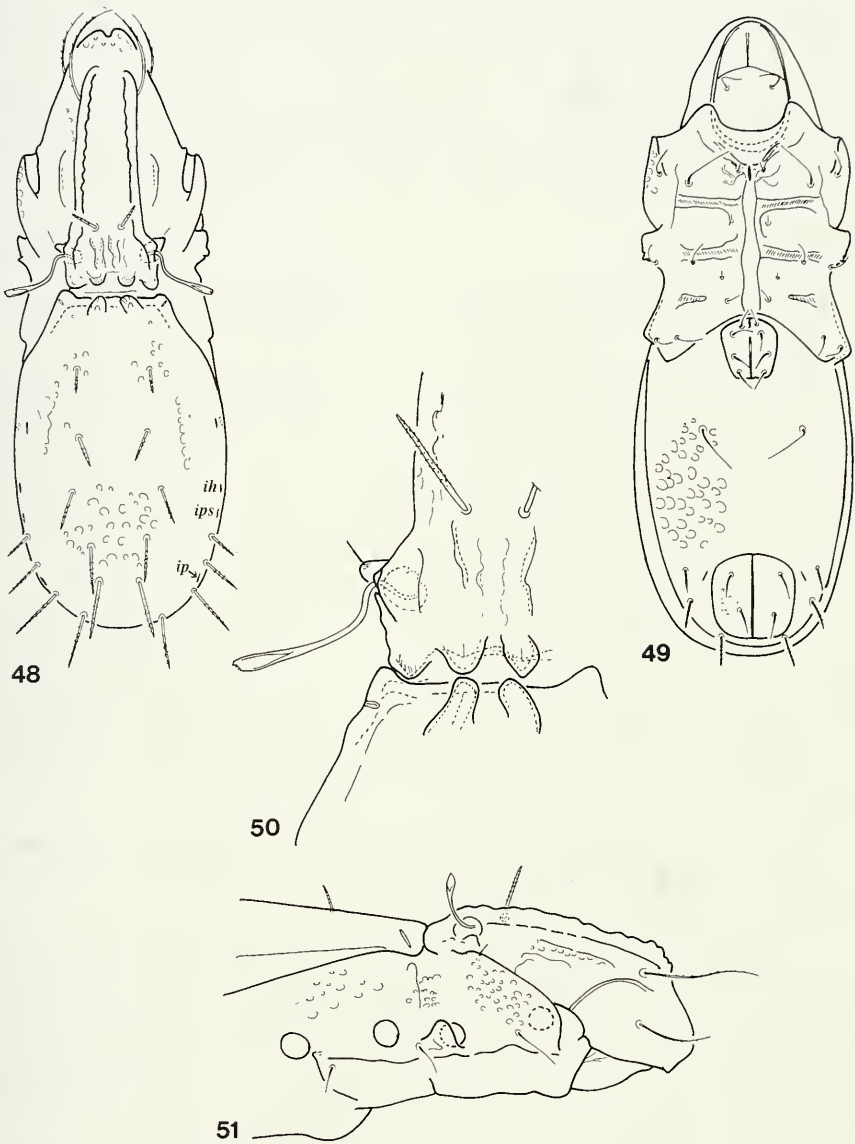
Ventral region (Fig. 49): Epimeral surface lacking sculpture, apodemes and epimeral borders well developed, typical for the genus. Epimeres well framed



Figs 44-47

Dolicheremaeus sulcatus sp. n. — 44: posterior part of notogaster in lateral aspect, 45: tarsus and tibia of leg IV, 46: leg I, 47: trochanter, femur and genu of leg IV.

medially, between them a well-defined median field visible. Among the epimeral setae (3 - 1 - 3 - 3) great differences in length, setae *Ib* the longest of all. Ventral plate with large foveolae, as on the notogastral surface. Genital setae strong, setiform, aggenital setae longer than adanal ones. Anal setae thin, setiform, adanal ones ensiform, slightly dilated. Setae *ad*₃ arising closer to the lateral margin of the ventral plate than to the anal aperture. Lyrifissures *iad* in inverse apoanal position.



FIGS 48-51

Dolicheremaeus yoshii sp. n. – 48: body in dorsal aspect, 49: body in ventral aspect, 50: dorsosejugal region, 51: podosoma in lateral aspect.

Legs: Type of ultimate setae: L - S - S - S. Tarsi I-III with triangular teeth dorsally, they are absent on tarsus IV. Leg IV with two dilated plumose ventral setae (v'' and pv'').

Remarks: The new species is readily distinguished from all the heretofore described species of the genus on the basis of the missing setae c_2 .

Derivatio nominis: I dedicate the new species to the late Prof. Dr. R. Yoshii for his help in the realization of this collecting trip.

Otocephalus bajau sp. n.

Figs 52-55

Material examined: Sabah: Holotype: Sab-82/4, 6 paratypes from the same sample. Holotype and 4 paratypes: MHNG; 2 paratypes (1963-PO-94): HNHM.

Measurements: Length of body: 1265-1501 μm ; width of body: 556-657 μm .

Prodorsum: Rostral apex and surface of lamellae weakly foveolate. Lamellae long, narrow, slightly bent medially and convergent anteriorly. Two pairs of well developed prodorsal condyles of nearly equal size, lateral one widely rounded, median one slightly triangular (Fig. 54). Bothridium with a rounded ventral plate. Rostral and lamellar setae setiform, finely ciliate, with a filiform distal end. Interlamellar setae ensiform, exobothridial one simple and short. Sensillus small, with a lanceolate head sometimes bearing some scattered spicules.

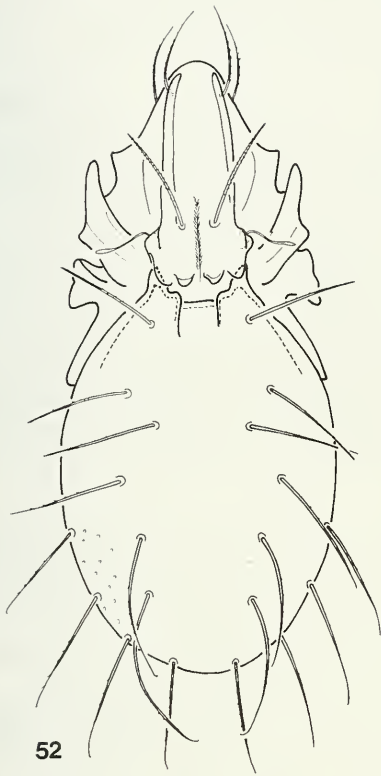
Notogaster: Surface ornamented by a weak polygonal sculpture consisting of small granules. One pair of very large notogastral condyles present, with a very long outer apex, covering the rounded prodorsal one (Fig. 52). Ten pairs of long notogastral setae present, setae c_2 and la ensiform, all the others setiform. Their length gradually increasing toward the posterior part of notogaster. Setae $p_1 = h_1$ the longest of all. Only one lyrifissure (ih) located in front of h_3 , ips visible between setae p_3 and p_2 .

Lateral part of podosoma: Pedotecta I and II-III very large, posterior part of the latter larger than the anterior part, its margin foveolate (Fig. 55). Discidium with a large posterior corner, carrying only one pair of setae ($4c$).

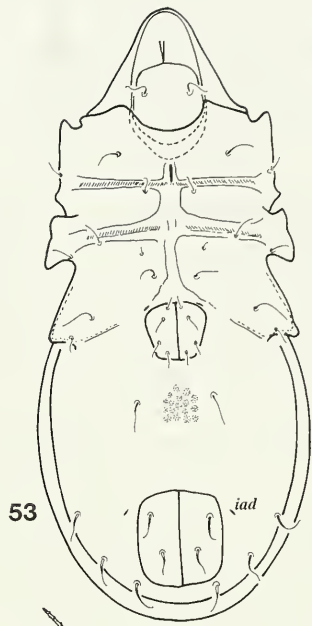
Ventral region (Figs 53): Completely covered by cerotegument granules, on the third and fourth epimeres they compose polygonal fields, a similar formation also on the notogaster and on the ventral plate. Epimeral borders and apodemes of usual shape, epimeral setae simple. Among them setae $1b$, $3b$ and $4b$ longer than their corresponding outer pairs ($1c$, $3c$ and $4c$). Genital setae short, simple; the aggenital, anal and adanal setae nearly equal in length, all slightly thickened basally, their ends filiform, slightly flagellate. Lyrifissures iad in inverse apoanal position.

Legs: All segments of legs very long and narrow. Tarsus I with triangular teeth, latter absent from tarsi II-IV. Type of ultimate setae: L - S - S - S. Seta v'' on tibia IV and pv'' on tarsus IV plumose.

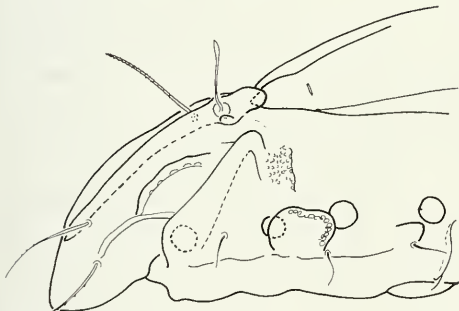
Remarks: The new species is related to *O. holtmanni* Aoki, 1965. However, it is distinguished from *O. holtmanni* by the ratio of the epimeral setae ($3c$ longer than $3b$ in *O. holtmanni*) and the prodorsal sculpture (lateral part of prodorsum foveolate in *O. holtmanni*, smooth in the new species).



52



53



55



54

Figs 52-55

Otocepheus bajau sp. n. – 52: body in dorsal aspect, 53: body in ventral aspect, 54: dorso-sejugal region, 55: podosoma in lateral aspect.

Derivatio nominis: This species is named after the Bajau people inhabiting mainly the coastal area of Sabah.

***Otocephus berndhauseri* sp. n.**

Figs 56-59

Material examined: Sabah: Holotype: Sab-82/15, 2 paratypes from the same sample; 1 paratype Sab-82/23. Holotype and two paratypes: MHNG; 1 paratype (1958-PO-94): HNHM.

Measurements: Length of body: 986-1098 μm ; width of body: 472-556 μm .

Prodorsum: Rostrum strongly foveolate, some foveolae visible also in the interlamellar region. A transversal band is present in front of the lamellar cusps. Lamellae long, rather wide, running parallel to each other, ending far from the rostral apex. Both pairs of prodorsal condyles well developed and rounded, the median ones not connected with each other (Fig. 58). Rostral setae comparatively short, setiform, exobothridial setae minute, hardly discernible, lamellar and interlamellar ones very long, filiform, much resembling the other notogastral setae. All setae finely and sparsely ciliate. Sensillus comparatively small, twisted backwards, its head smooth, slightly asymmetrical in lateral aspect (Fig. 59).

Notogaster: Lateral notogastral condyles very large, hardly narrower than the distance between them. Ten pairs of extremely long and filiform notogastral setae present, no essential difference between them (Fig. 56). Five pairs of lyrifissures also present, their position normal (*ips* located between setae h_3 and p_3).

Lateral part of podosoma: Pedotecta I long, pedotecta II-III large, fishtail-shaped, ornamented by foveolae or spots (Fig. 59). Discidium very large.

Ventral region: In the coxisternal region only two pairs of apodemes conspicuous, the epimeral borders and the other apodemes poorly developed. Epimeral setae short, the short setae *1b* being unusual. All setae on epimere I arising in the posterior part of this field. Both setae *3a - 3b* and also setae *4b - 4c* arising conspicuously near to each other (Fig. 57). All epimeral setae finely ciliate or roughened. Ventral plate foveolate. Genital, aggenital and anal setae normal, setiform, adanal setae very long, filiform and flagellate at their distal end. Setae *ad*₃ arising far from the anal aperture, near to the lateral margin of the ventral plate. Lyrifissures *iad* in paraanal position.

Legs: Type of ultimate setae: L - S - S - S. All joints of legs conspicuously long and narrow. Femur IV with very large genual lamellae. Seta *l''* on genua II-IV long, spiniform, setae *v* on femora II-III also conspicuously long. Setae *v''* on tibia IV and *pv'* on tarsus IV dilated and plumose.

Remarks: The new species has a unique body chaetotaxy within this genus. On this basis it is readily distinguished from all related species.

Derivatio nominis: I dedicate the new species to my friend Dr. B. Hauser (Geneva), the organizer of this expedition and collector of this very rich material.

***Otocephus kadazan* sp. n.**

Figs 60-63

Material examined: Sabah: Holotype: Sab-82/15, 1 paratype from the same sample. Holotype: MHNG; paratype (1961-PO-94): HNHM.

Measurements: Length of body: 1014-1029 μm ; width of body: 403-417 μm .

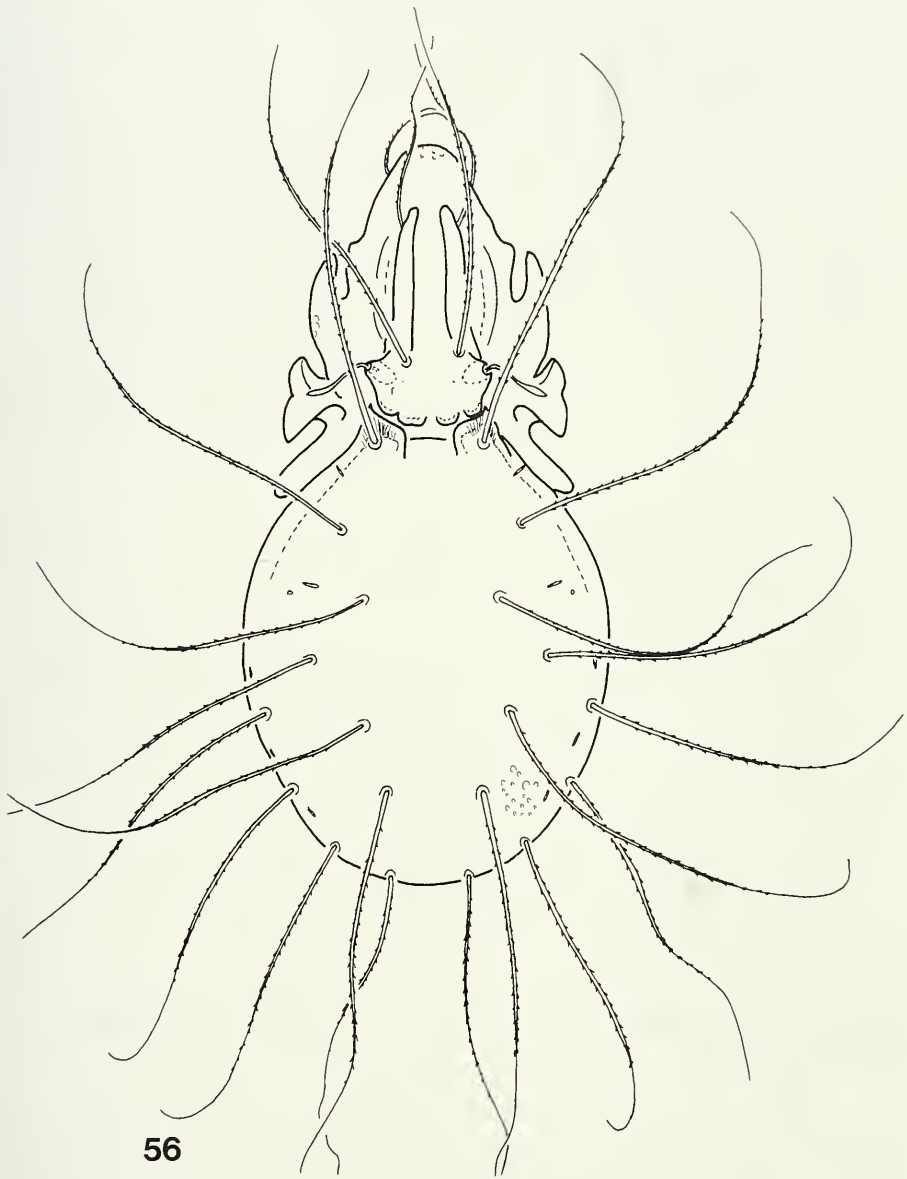
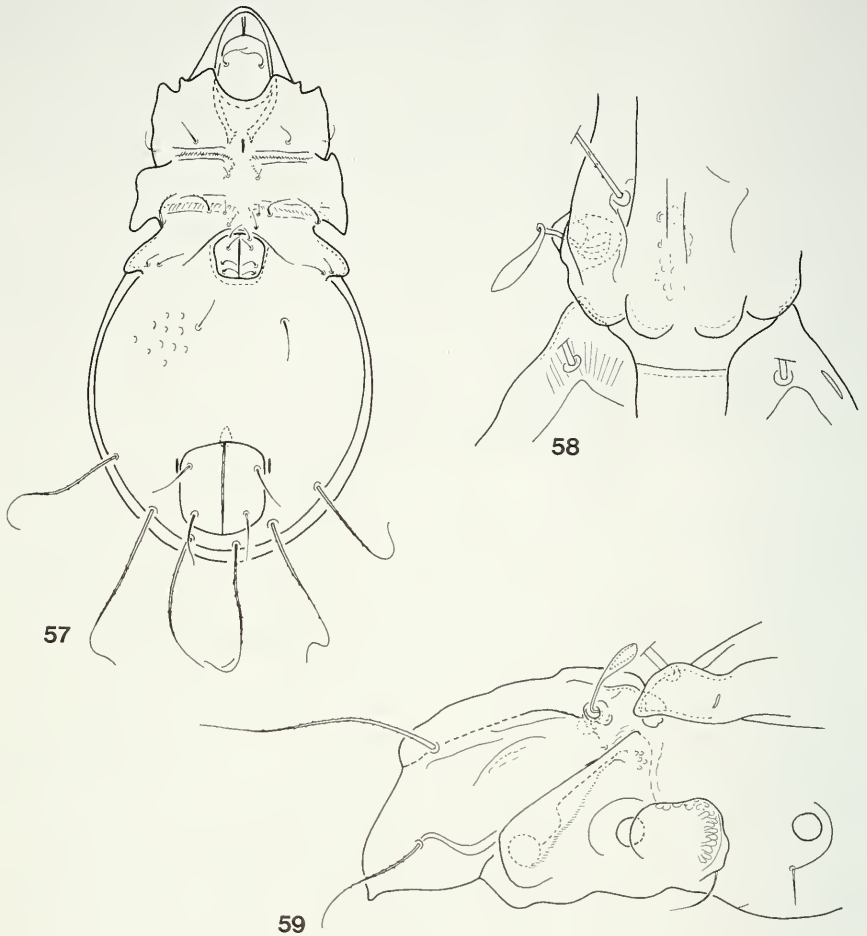


FIG. 56

Otocephalus berndhauseri sp. n. — 56: body in dorsal aspect.



FIGS 57-59

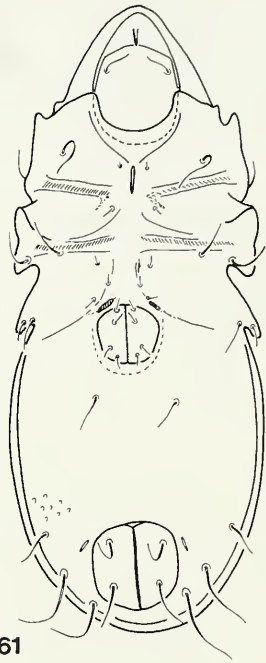
Otocepheus berndhauseri sp. n. – 57: body in ventral aspect, 58: dorsosejugal region, 59: podosoma in lateral aspect.

Prodorsum: Rostrum weakly foveolate, interlamellar region with some longitudinal crests. Lamellae very long, coming close to the rostrum, bent outwards medially, inwards distally (Fig. 60). Both pairs of prodorsal condyles well developed, both rounded (Fig. 62). Rostral and lamellar setae long, simply setiform, pilose, interlamellar ones ensiform, finely spiculate. Exobothridial setae short, fine, straight. Sensillus with a small lanceolate head, without any spiculae or cilia.

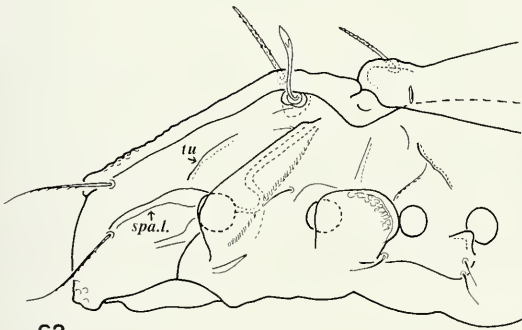
Notogaster: Its surface well foveolate, the foveolae are arched, small and partly connected laterally. Ten pairs of notogastral setae present, six pairs ensiform, like the interlamellar ones, 4 pairs in posteromarginal position setiform, but mostly



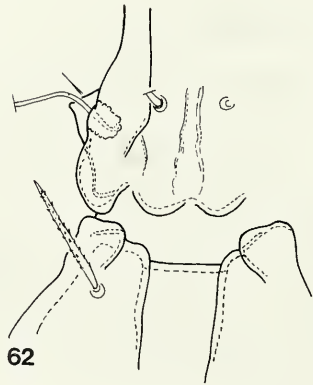
60



61



63



62

FIGS 60-63

Otocepheus kadazan sp. n. – 60: body in dorsal aspect, 61: body in ventral aspect. 62: dorso-sejugal region, 63: podosoma in lateral aspect.

straight, only their distal end curved. Anterior setae arising nearly in one longitudinal row. Setae h_3 much shorter than setae $p_1 - p_2$, h_3 inserted much farther from p_3 than the latter one from p_2 .

Lateral part of podosoma: All pedotecta and discidium well developed, posterior margin of pedotecta II-III ornamented by foveolae (Fig. 63). Lateral lamelliform expansion double arched between the acetabulum and the insertion of rostral setae.

Ventral region: Surface of coxisternal region without any characteristic features, apodemes and epimeral borders also typical for the genus. *Bo.* 4 absent, close to the anterior corner of the genital aperture a short, weakly sclerotized lath observable. Epimeral setal formula: 3 - 1 - 3 - 3. Among these setae *1b*, *3b* and *4b* longer than the others, setae *1c* arising far laterally and posteriorly. Ventral plate foveolate. Genital setae simple and short. No setae in postanal position and setae ad_3 arising far from the anal apertures, laterally (Fig. 61). All adanal setae relatively long, with a filiform distal part. Lyrifissures *iad* in inverse apoanal position.

Legs: Type of ultimate setae: L - S - S - S. Tarsus I with triangular teeth, latter absent on the other tarsi.

Remarks: The new species may be clearly characterised by the form and position of the notogastral setae and the notogastral condyles. It stands nearest to *O. duplicornutus* (Aoki, 1965). However, its posteromarginally placed notogastral setae are much longer than in *O. duplicornutus*.

Derivatio nominis: This species is named after the Kadazan people which lives in the Mt. Kinabalu area.

Otocephus keningau sp. n.

Figs 64-67

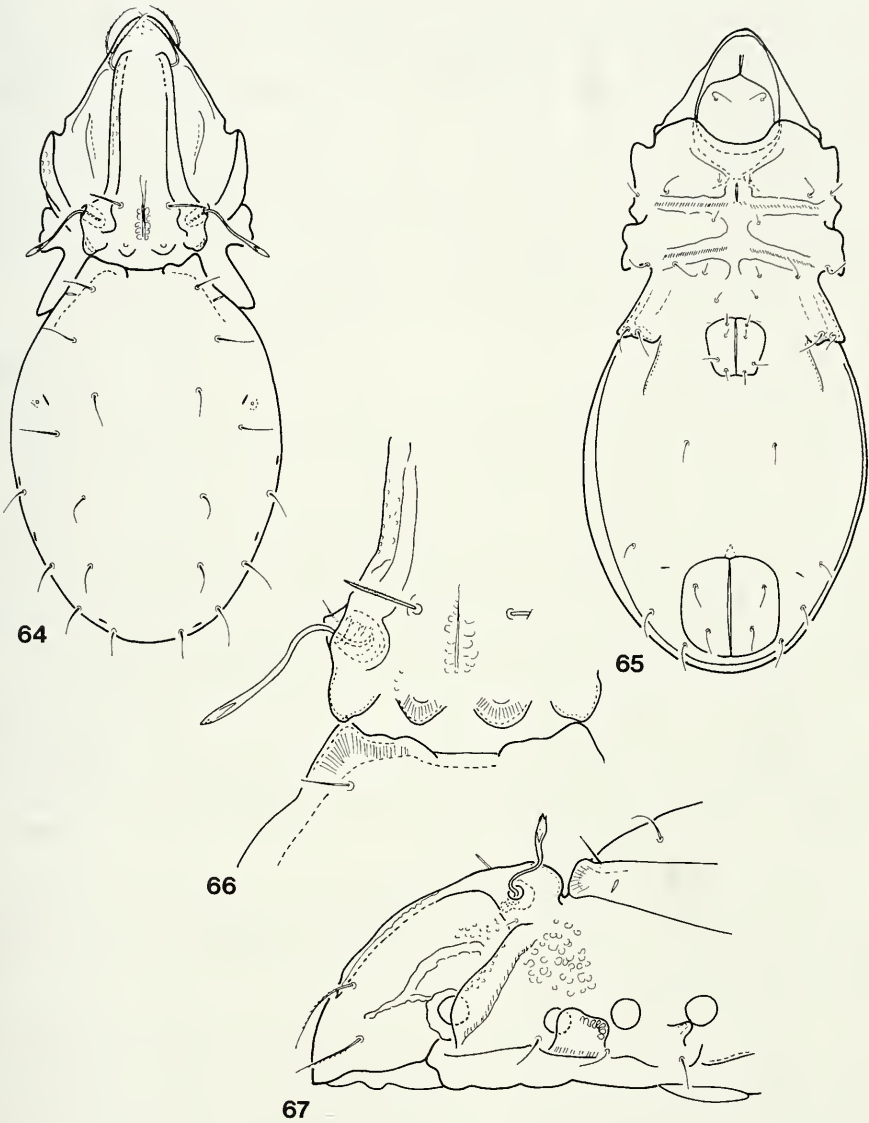
Material examined: Sabah: Holotype: Sab-82/43, 2 paratypes from the same sample. Holotype and 1 paratype: MHNG; 1 paratype (19-PO-94): HNHM.

Measurements: Length of body: 792-1057 μm ; width of body: 326-487 μm .

Prodorsum: Rostrum and surface of lamellae with some foveolae. Tutorium and lateral lamelliform expansion well developed. Two pairs of prodorsal condyles present, lateral pair slightly bigger than the median ones, with some very weak light spots. Median part of the interlamellar region: Fig. 66. Rostral and lamellar setae setiform, strongly ciliate unilaterally, lamellar setae geniculate, the rostrals simply arched. Interlamellar setae ensiform, short; exobothridial setae minute. Sensillus long, its head narrowly lanceolate but thin, bearing some minute spicules on its distal end (Fig. 66).

Notogaster: Its surface smooth or finely punctulate. Only one pair of lateral notogastral condyles present, not highly protruding, but with a much extending margin medially. Ten pairs of very short and fine notogastral setae present, they are setiform with flagellate ends. Lyrifissures *ips* located between setae p_3 and h_3 .

Lateral part of podosoma: Tutorium and lateral lamelliform expansion connected with each other, a small field near the basal part of the tutorium weakly foveolate. Sejugal region also ornamented by foveolae. Pedotecta I and II-III large, discidium also well developed, with a large corner posteriorly (Fig. 67).



FIGS 64-67

Otocephalus keningau sp. n. — 64: body in dorsal aspect, 65: body in ventral aspect, 66: dorsosejugal region, 67: podosoma in lateral aspect.

Ventral region (Fig. 65): Coxisternal and ventral plates lacking sculpture. Epimeral border and apodemes conspicuous. Epimeral setal formula: 3 - 1 - 3 - 3. All setae in these two regions short and simple. Setae *1c* placed posteriorly and laterally, *4b* and *4c* arising near to each other. Setae *ad*₃ situated laterally, near to margin of the ventral plate.

Legs: Type of ultimate setae: L - S - S - S. Seta *v*" on tibia IV and *pv*" on tarsus IV plumose.

Remarks: The new species is characterised by the fine and short notogastral setae and the flat notogastral condyles. On this basis it is readily distinguished from all heretofore described otocephoid species.

Derivatio nominis: This species is named after the city of Keningau.

***Otocephus lienhardorum* sp. n.**

Figs 68-71

Material examined: Sabah: Holotype: Sab-82/15, 1 paratype from the same sample; 1 paratype Sab-82/16. Holotype and 1 paratype: MHNG; 1 paratype (1960-PO-94): HNHM.

Measurements: Length of body: 847-1004 μm ; width of body: 336-459 μm .

Prodorsum: The whole body is conspicuously wide. Rostral apex foveolate, other surfaces smooth or finely punctate. Lamellae long, running clearly parallel to each other. Prodorsal condyles nearly equal in size, both pairs well rounded (Fig. 70). Rostral setae setiform, with fine distal ends, lamellar ones also setiform, but their distal end blunter (Fig. 68), all distinctly ciliate. Interlamellar setae ensiform, straight, exobothridial setae minute. Sensillus simple, with a smooth lanceolate head.

Notogaster: Lateral margin smooth, its inner surface distinctly pustulate (Fig. 68). The shape and the density of pustules varying. A pair of very large notogastral condyles present, their anterolateral corner conspicuously long. Ten pairs of notogastral setae present all, excepting the 4 pairs in posteromarginal position, of nearly equal length and size, all ensiform and finely roughened or spiculate. Setae *p*₁ - *p*₃ and *h*₃ long, simple, filiform.

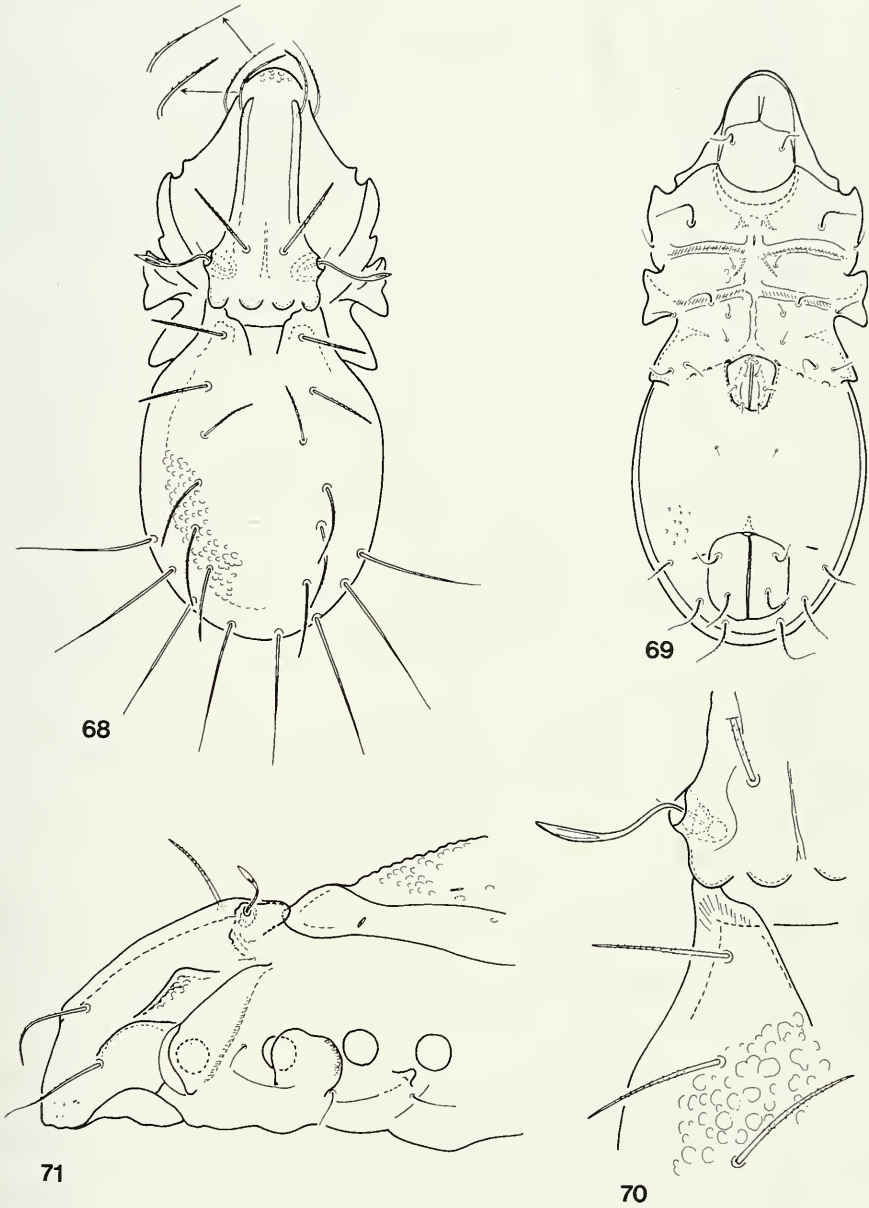
Lateral part of podosoma: Lateral lamelliform expansion arched, turtorium long, reaching close to the preceding one (Fig. 71). All pedotecta and the discidium well developed, the fishtail-shaped pedotecta II-III ornamented by some foveolae on their posterior margin.

Ventral region: Surface of epimeres without any particular sculpture. Epimeral setae normally developed but seta *1a* minute or absent, setae *1b* and *2b* longer than the rest. At the anterior corner of the genital plates a minute, well sclerotized structure observable. Ventral plate foveolate. Setae in the anogenital region short, setae *ad*₃ arising laterally, slightly farther from *ad*₂ than the latter from *ad*₁. Lyrifissure *iad* in inverse apoanal position (Fig. 69).

Legs: Type of ultimate setae: L - S - S - S. Two small teeth visible on tarsus I, they are absent from the other legs.

Remarks: The new species is well characterised by its notogastral surface, thus easily distinguishable from all related taxa.

Derivatio nominis: I dedicate the new species to my friends, Dr. C. Lienhard's family (Geneva).



FIGS 68-71

Otocepheus lienhardorum sp. n. – 68: body in dorsal aspect, 69: body in ventral aspect, 70: dorsosejugal region, 71: podosoma in lateral aspect.

Otocephus nepenthes sp. n.

Figs 72-75

Material examined: Sabah: Holotype: Sab-82/34. Holotype: MHNG.

Measurements: Length of body: 959 μm ; width of body: 383 μm .

Prodorsum: Rostrum slightly convex medially. Surface foveolate and/or alveolate. Lamellar surface also foveolate, interlamellar region strongly foveolate basally, with a broad border around the foveolae. Lamellae long and wide. Two pairs of prodorsal condyles present, lateral ones well rounded and fitting into the opposite notogastral condyles. Median prodorsal condyles much smaller, slightly triangulate. Rostral and lamellar setae setiform, strongly pilose, interlamellar ones ensiform, exobothridial ones comparatively long. Sensillus lanceolate (Fig. 72).

Notogaster: The whole body surface covered by a thick cerotegument layer of larger or smaller granules or tubercles, giving the surface a pustulate appearance. This ornamentation is absent from the sejugal region, including a narrow band behind the notogastral condyles. One pair of very large notogastral condyles present, with an unusually excavated anterolateral part accepting the lateral prodorsal condyles (Fig. 74). Their median part well separated and projecting forwards, giving the impression of two condyles. Ten pairs of notogastral setae present, c_2 and la fusiform, the others setiform with a slightly dilated basal part. Their length gradually increasing posteriorly (Fig. 72), h_1 and p_1 being the longest setae of all.

Lateral part of podosoma: Pedotecta I normal, pedotecta II-III smaller than usual, the fishtail-shaped formation hardly discernible (Fig. 75). Discidium with a very large posterior corner bearing two epimeral setae (*4b*, *4c*). Epimeral foramen conspicuous, well bordered.

Ventral region: Mentum and the epimeral surface alveolate-reticulate. The cerotegument layer thick, but not so typically granulate as the notogaster or the ventral plate. Epimeral setae comparatively long, setae *2a* long and arising far from each other. Setae *4b* and *4c* placed very close to each other, both arising on the posterior margin of the discidium. Posteromarginal ridges (postpodosomal ornamentation *opp* in Aoki, 1965) continuing in longitudinal crests on the ventral plate (Fig. 73) and a small node (the genital fissure *iag* in Aoki 1965) conspicuous. Genital plates with a well sclerotised longitudinal ridge. Surface of anal plates also with cerotegumental tubercles. All setae in the anogenital region simply setiform. Setae *ad*₃ placed far laterally. Lyrifissures *iad* in adanal position, near to the anal aperture.

Legs: Type of ultimate setae: L - S - S - S. Seta *l*" of genua I-II very strong, long, spiniform. Seta *v*" on tibia IV and *pv*" on tarsus IV plumose.

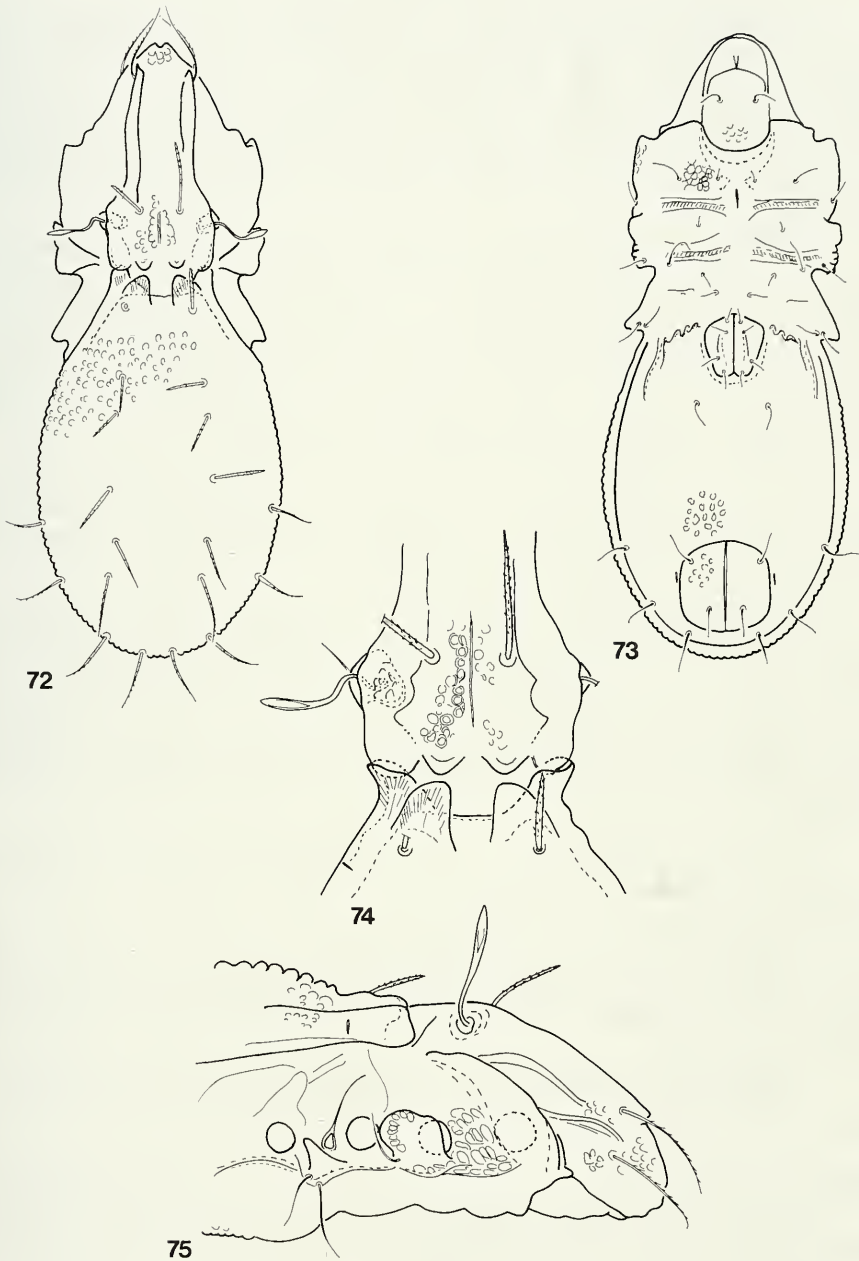
Remarks: On the basis of its unique ornamentation the new species is readily distinguishable from all the heretofore described otocephoid taxa.

Derivatio nominis: Reference to the pitcher plants, which have many endemic species on Mt. Kinabalu.

Otocephus orangutan sp. n.

Figs 76-79

Material examined: Sabah: Holotype: Sab-82/27, 7 paratypes from the same sample. Holotype and 4 paratypes: MHNG; 2 paratypes (1962-PO-94): HNHM.



FIGS 72-75

Otocephalus nephenthes sp. n. – 72: body in dorsal aspect, 73: body in ventral aspect, 74: dorsosejugal region, 75: podosoma in lateral aspect.

Measurements: Length of body: 708-861 μm ; width of body: 250-390 μm .

Prodorsum: Rostral apex wide, its surface foveolate. Lamellae wide and long, running parallel to each other, their surface irregularly foveolate. Interlamellar region with some crests. Two pairs of well developed, slightly angular prodorsal condyles of nearly equal size present (Fig. 78). Rostral and lamellar setae fine, setiform, unilaterally pilose. Interlamellar ones ensiform, slightly roughened. Exobothridial setae very short. Head of sensillus wide, with a stout distal end, surface distally bearing some spicules.

Notogaster: One pair of large notogastral condyles with an excavate anterior margin. Notogastral surface strongly foveolate. Among notogastral setae great differences exist in length and size. Setae c_2 ensiform, setae la and lm reduced, only short, arched, bacilliform setae observable (Fig. 76). Setae p_3 and h_3 also very short, but fine and setiform. The remaining setae longer than the preceding ones, all straight and ensiform. The surface of the ensiform setae roughened or ornamented with minute spicules. Lyrifissure *ips* located between setae p_3 and r_3 .

Lateral part of podosoma: Pedotecta I normal, pedotecta II-III typically fish-tail-shaped, the margin of the latter strongly foveolate. Lateral lamelliform expansion mostly straight, directed toward the insertion of rostral setae and touching them (Fig. 79).

Ventral region: Epimeral surface lacking conspicuous sculpture, apodemes and epimeral borders conspicuous. Ventral plate foveolate, but only laterally. Epimeral setal formula: 3 - 1 - 3 - 3. Among the epimeral setae great differences exist, three pairs ($1b$, $3b$, $4b$) much longer than the others, all filiform. Setae $1c$, $3c$ and $4c$ conspicuously short, $1a$ and $2a$ minute or very short. Genital, aggenital and adanal setae fine, short and setiform. Anal setae different in length and size: an_1 long but fine, clearly blunt at tip, an_2 resembling adanal setae (Fig 77). Lyrifissures *iad* in adanal position.

Legs: Type of ultimate setae: L - S - S - S. Triangular projection on tarsi I and II present, on tarsi III and IV absent. Seta v'' on tibia IV and pv'' on tarsus IV broadened, the latter twice as large as the former.

Remarks: On the basis of the fine and short notogastral and the adanal setae, the new species is related to *Otocepheus heterosetiger* Aoki, 1965. However, the new species is distinguished from it by lacking median prodorsal condyles and the reduced la and lm setae.

Derivatio nominis: The species is named after the orang-utan, the most characteristic mammal of Borneo.

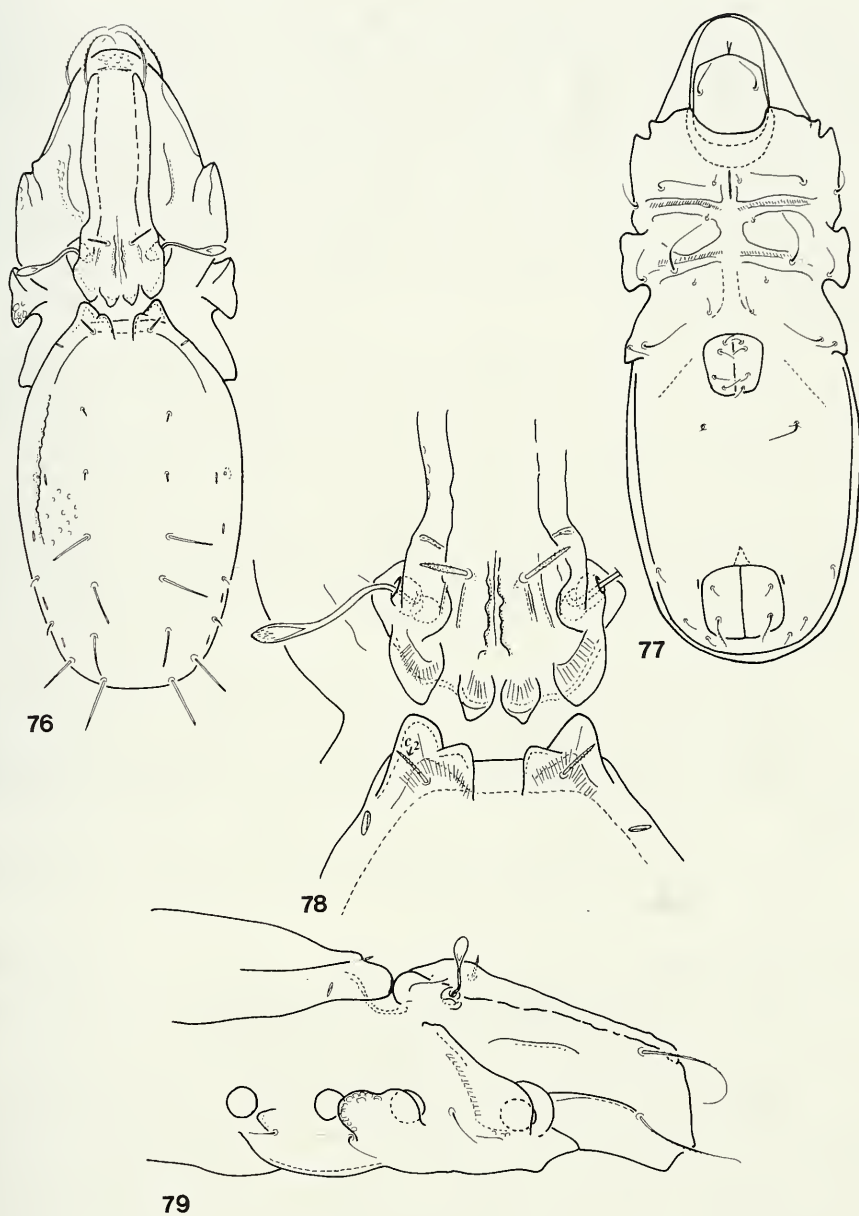
Otocepheus rafflesiae sp. n.

Figs 80-83

Material examined: Sabah: Holotype: Sab-82/27, 1 paratype from the same sample. Holotype: MHNG; paratype (1965-PO-94): HNHM.

Measurements: Length of body: 1292-1515 μm ; width of body: 542-640 μm .

Prodorsum: Rostral apex and lateral part of prodorsum well foveolate. Lamellae long and wide, running mostly parallel, their surfaces also foveolate.



FIGS 76-79

Otocephalus orangutan sp. n. – 76: body in dorsal aspect, 77: body in ventral aspect, 78: dorsosejugal region, 79: podosoma in lateral aspect.

Tutorium conspicuous in dorsal aspect, long, reaching to the lateral lamelliform expansion. Two pairs of prodorsal condyles present, outer pairs (*co.pl.*) angulate, median ones very small (Fig. 82). Rostral and lamellar setae setiform, with strongly ciliate filiform distal ends. Interlamellar setae ensiform, sparsely pilose, exobothridial setae minute. Sensillus very small, its head rounded, well barbed (Fig. 80).

Notogaster: Form of notogaster characteristic; the anterior third being its widest part. Surface ornamented by indistinct foveolae. Marginal ridges well developed. Notogaster with only one pair of large condyles, situated laterally and removed far from each other. This distance is longer than their diameter. Ten pairs of ensiform notogastral setae present, all finely spiculate. Lyrifissures *ips* located between setae p_3 and h_3 .

Lateral part of podosoma: Pedotecta I long and narrow, pedotecta II-III very large, with foveolae on its posterolateral margin and some pustules anteriorly (Fig. 82). Sejugal region also pustulate. Tutorium long, connected with the arched lateral lamelliform expansion. The latter reaching to the insertions of the rostral setae.

Ventral region (Fig. 81): Epimeral surface smooth, apodemes normal. The posterior margin of the epimeral region with a characteristic, catenate structure (*opp*). Epimeral setae comparatively long, well ciliate. Ventral plate rarely foveolate, genital and anal plates smooth. Genital setae strong, not smaller than the aggenital ones, but all setae in the anal region longer than the preceding ones. They are of equal length, excepting setae ad_3 .

Legs: Type of ultimate setae: L - S - S - S. Lateral setae (l'') of genua I-II long, strong, spiniform. Seta v'' on tibia IV and pv'' on tarsus IV plumose.

Remarks: The new species is readily distinguished by the shape of the notogaster, the very small and rounded sensillus and the subequal anal and adanal setae. This combination of characters is unknown among the heretofore described species.

Derivatio nominis: This species is named after the largest flower of the world, which occurs in Sabah.

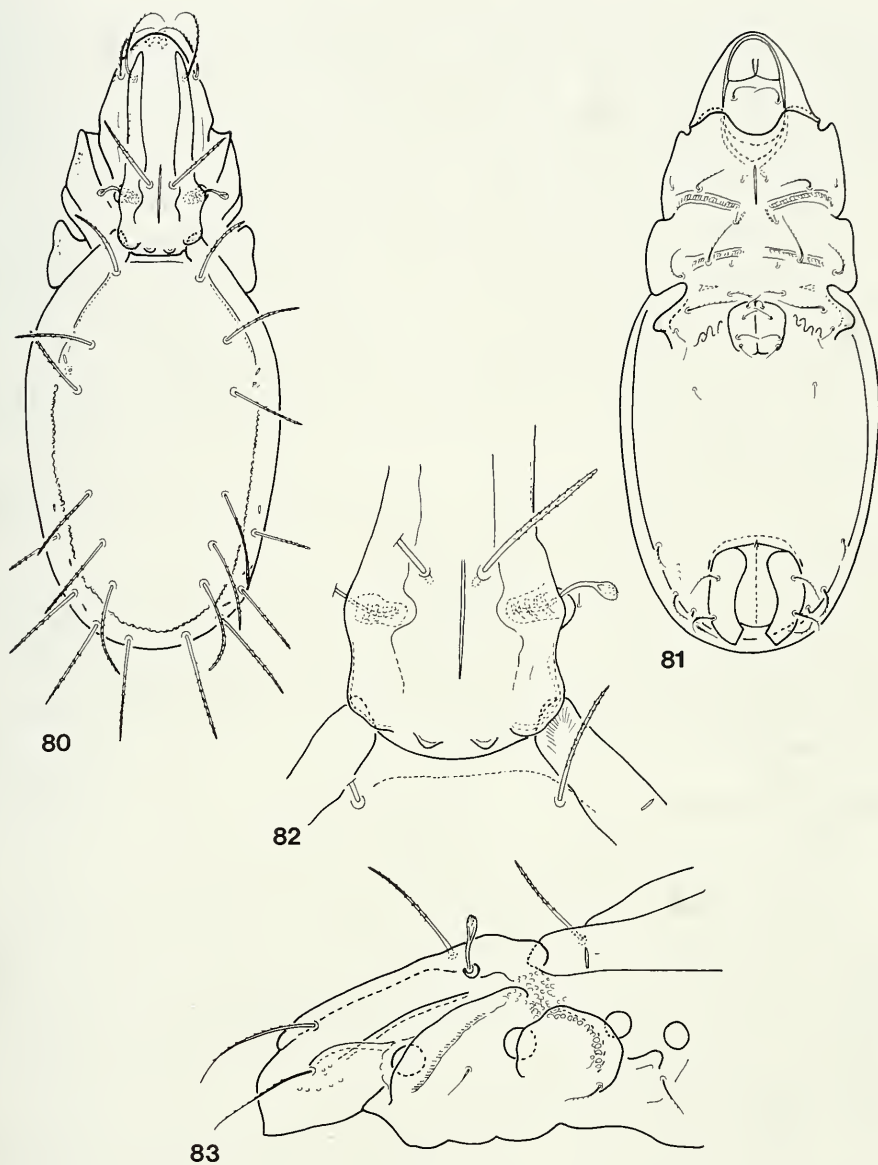
Otocephalus reniformis sp. n.

Figs 84-87

Material examined: Sabah: Holotype: Sab-82/15, 36 paratypes from the same sample. Holotype and 19 paratypes: MHNG; 12 paratypes (1957-PO-94): HNHM.

Measurements: Length of body: 657-862 μm ; width of body: 278-403 μm .

Prodorsum: Finely granulated cerotegument covering nearly the whole body surface. Prodorsum rarely foveolate. Rostrum rounded, lamellae slightly convergent anteriorly, overlapping the insertion of the lamellar setae. Interlamellar region with some longitudinal wrinkles. Tutoria long, reaching to the lateral lamelliform expansions (Fig. 87). The latter directed toward the insertion of the rostral setae and touching them. Very large prodorsal condyles present (Fig. 86), lateral ones rounded, larger than the median ones. The latter condyles connected with each other, but this connection is indistinct medially. Lamellar and rostral setae setiform, distinctly pilose, interlamellar setae blunter at tip, sparsely pilose. Sensillus simple, its head lanceolate, smooth.



FIGS 80-83

Otocephus rafflesiae sp. n. — 80: body in dorsal aspect, 81: body in ventral aspect, 82: dorsosejugal region, 83: podosoma in lateral aspect.

Notogaster: One pair of large notogastral condyles present, opposite to both prodorsal ones. The size of the 10 pairs of notogastral setae characteristic, setae c_2 ensiform and acuminate, setae *da* clearly dilated medially, fusiform. All other setae nearly setiform, conspicuously long, excepting setae h_3 being only half as long as seta p_1 (Fig. 84), primarily on the posterior part of the notogaster. Setae r_3 also much shorter than p_1 . Five pairs of lyrifissures well discernible, in normal position.

Lateral part of podosoma: Pedotecta I large, normal, pedotecta II-III fishtail-shaped, also large and ornamented by some spots or wrinkles. Discidium normal.

Ventral region: Surface weakly sculptured. Apodemes 2 and *ap. sej.* distinctly developed, *ap. 3*, *ap. 4* absent or hardly discernible. Epimeral borders also only partly visible (Fig. 85). All epimeral setae short, setae *1b* and *3b* longer than the others. Setae *4b* and *4c* arising close to each other. Epimeral setal formula: 3 - 1 - 3 - 3. Anogenital setal formula: 4 - 1 - 2 - 3, typical for the genus. Setae ad_3 only half as long as ad_1 . Anal and adanal setae with filiform distal ends. Lyrifissures *iad* in inverse apoanal position.

Legs: Type of ultimate setae: L - S - S - S. Seta *v* on genu II conspicuously long, setiform, on genu III much shorter and spiniform. Setae *v''* on tibia IV and *pv''* on tarsus IV plumose. Legs setal formulae normal.

Remarks: The new species is readily classified in the genus *Otocepheus* Aoki, 1965, on the basis of the position of lyrifissures *iad* it is related to *O. duplicornutus* Aoki, 1965. However, the new species is readily distinguished from all its congeners by the fusiform seta *da* and the ratio (very short h_3) of the notogastral setae.

Derivatio nominis: The species is named after the kidney-shaped condyle of the prodorsum.

Otocepheus spatulatus sp. n.

Figs 88-91

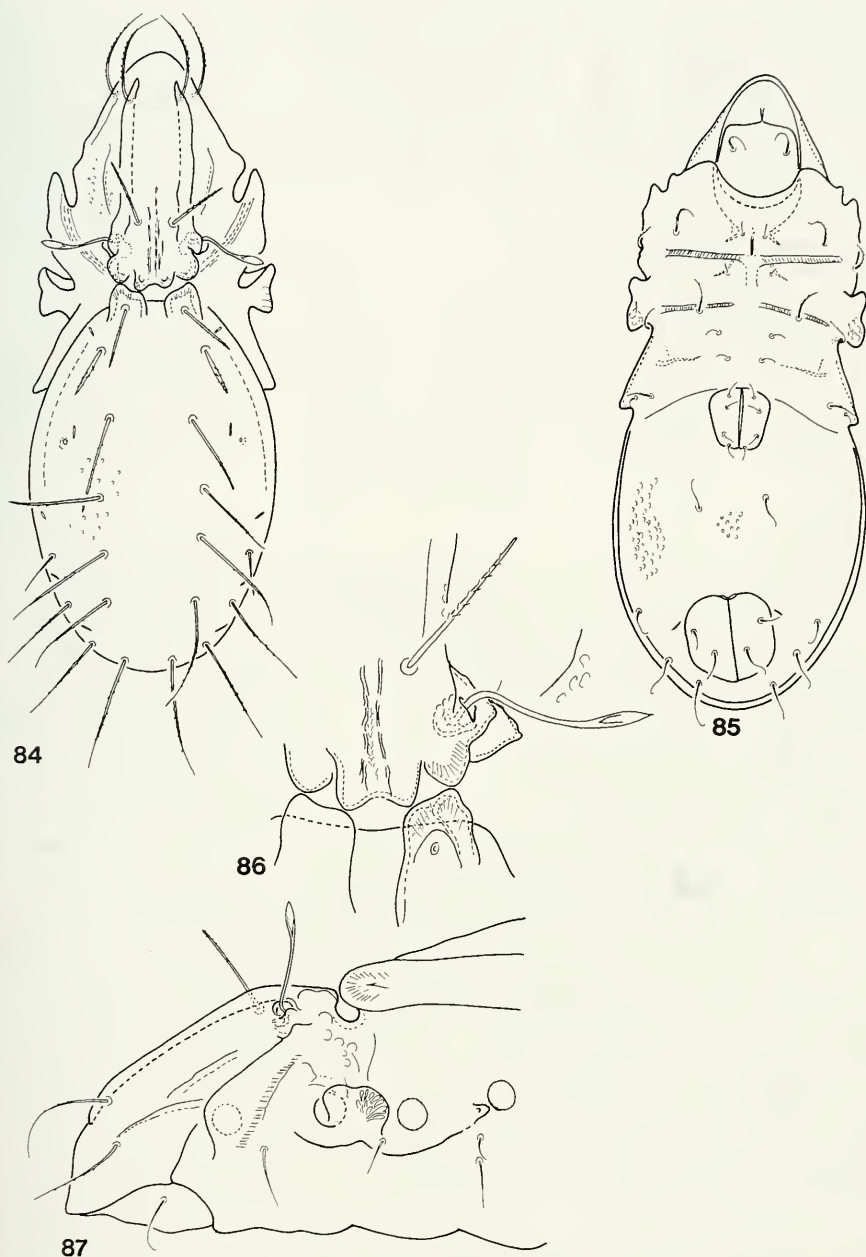
Material examined: Sabah: Holotype: Sab-82/50. Holotypus: MHNG.

Measurements: Length of body: 1035 μm ; width of body: 340 μm .

Prodorsum: Very wide in dorsal view, rostral apex, lateral part of prodorsum and surface of the long and wide lamellae with some weak foveolae. Tutorium strong, lateral lamelliform expansion well developed. One pair of rounded prodorsal condyles present, connected by a short transversal line. Rostral and lamellar setae setiform, well ciliate, interlamellar ones very short, but ensiform, exobothridial setae minute or reduced, hardly observable. Sensillus lanceolate, but very short, ending far from the lateral margin of prodorsum (in dorsal aspect).

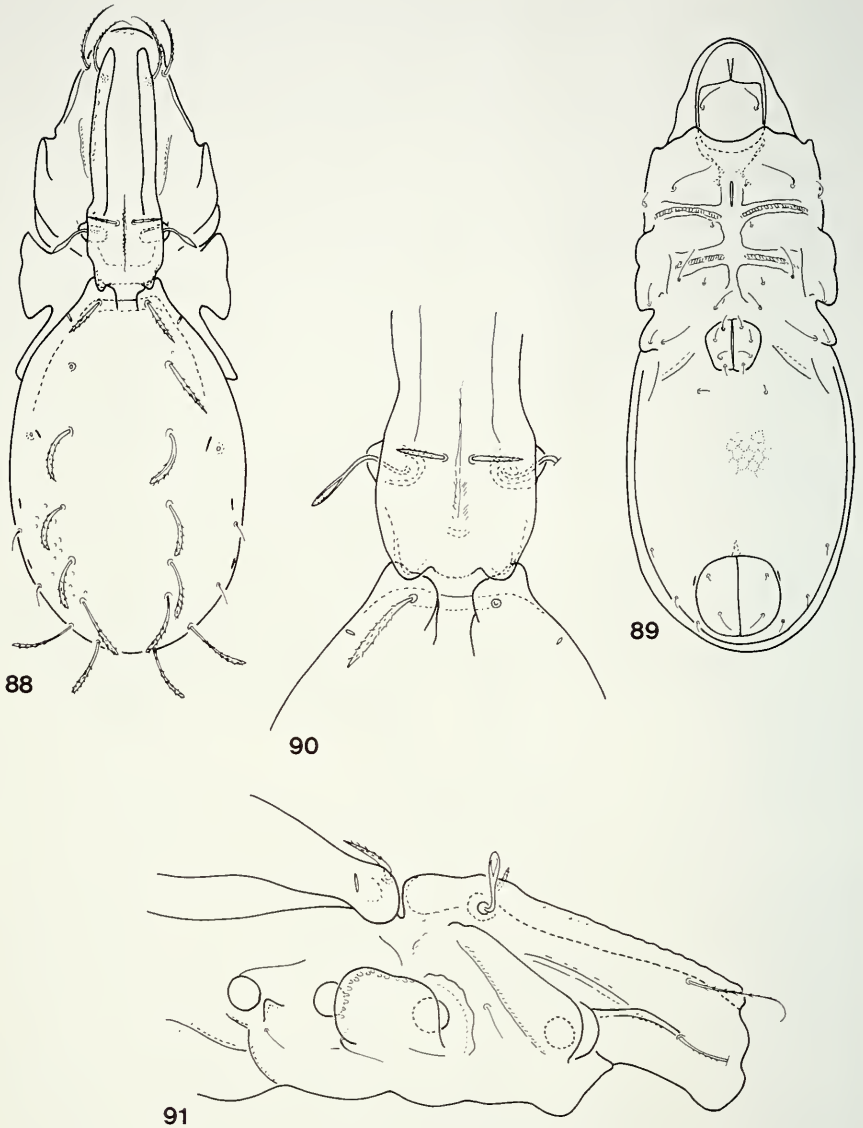
Notogaster: One pair of large notogastral condyles laterally, the distance between them smaller than the transversal diameter of one condyle. Surface of notogaster sparsely foveolate marginally. Ten pairs of notogastral setae present, two anterior pairs simple, fusiform, six other median pairs widened distally, slightly spatulate. Two pairs (setae p_3 and h_3) short, fine and simply setiform (Fig. 88). Lyrifissures *ips* situated between these two setae.

Lateral part of podosoma: Tutorium and the lateral lamelliform expansion arched, fused with each other and clearly extending to the insertion of the rostral setae (Fig. 91).



FIGS 84-87

Otocepeus reniformis sp. n. — 84: body in dorsal aspect, 85: body in ventral aspect, 86: dorsosejugal region, 87: podosoma in lateral aspect.



FIGS 88-91

Otocephalus spatulaus sp. n. — 88: body in dorsal aspect. 89: body in ventral aspect, 90: dorsosejugal region. 91: podosoma in lateral aspect.

Ventral region: Coxisternal region simple and unornamented, ventral plate with very fine polygonal reticulation. Apodemes, primarily *ap.* 2 and *ap. sej.*, characteristically arched (Fig. 89). Epimeral setae simple, setae *1b*, *3b* and *4b* longer than the others. Genital setae normal, aggenital setae very short. All three pairs of adanal setae short, simple and setiform, *ad*₃ arising far anteriorly and laterally, the distance between them and setae *ad*₂ much greater than between setae *ad*₁ and *ad*₂. Anterior anal setae (*an*₁) minute, the posterior ones much longer (Fig. 89). Lyrifissure *iad* in adanal position.

Legs: Type of ultimate setae: L - S - S - S. Seta *l*" of genua I-II very strong, long spiniform. Seta *v*" on tibia IV and *pv*" on tarsus IV plumose.

Remarks: The lack of median condyles of the prodorsum readily places the new species into the genus *Otocephus* sensu Aoki (1965). The peculiar form of the notogastral setae distinguishes the new species not only from the hitherto known species of this genus, but from all the species of the subfamily Otocephinae.

Derivatio nominis: The species name refers to the form of the notogastral setae.

Otocephus verrucosus sp. n.

Figs 92-95

Material examined: Sabah: Holotype: Sab-82/15. 3 paratypes from the same sample. Holotype and 2 paratypes: MHNG; 1 paratype (1959-PO-94): HNHM.

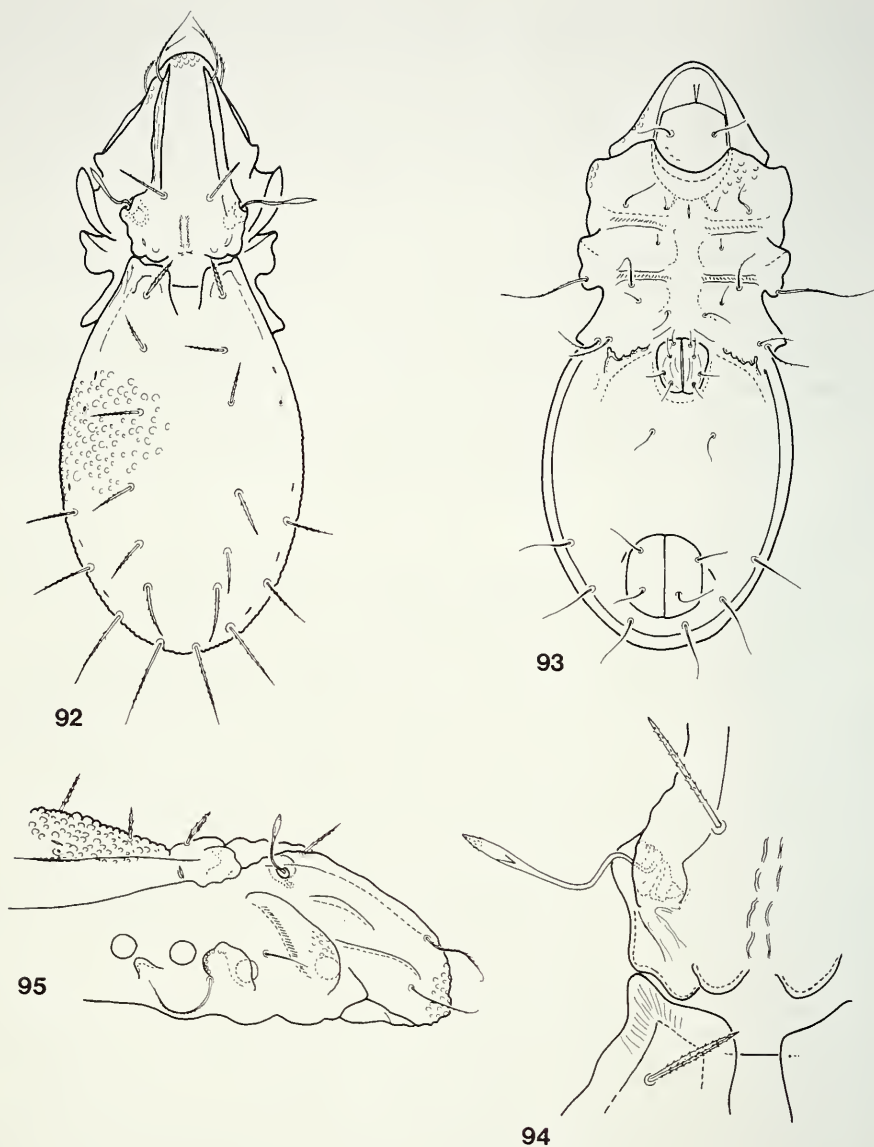
Measurements: Length of body: 931-960 μm ; width of body: 375 μm .

Prodorsum: Rostrum very wide, well foveolate. Lamellae long, running parallel to each other. Both pairs of prodorsal condyles present, no remarkable difference between them. Lateral condyles angulate, the median ones rounded. Some characteristic, small, longitudinal crests present in interlamellar position (Fig. 92). Tutorium short, directed towards the lateral lamelliform expansion but not touching it; the latter long and reaching beyond the insertion of the rostral setae. Rostral and lamellar setae long, simple, setiform, slightly ciliate. Interlamellar setae bacilliform, longer than the notogastral ones, but shorter than the rostral setae. Exobothridial setae completely reduced (I was unable to find their alveoli). Sensillus simple, its head weakly fusiform, with some minute spicules on its distal end.

Notogaster: Lateral notogastral condyles very large, the distance between them much smaller than their transversal diameter (Fig. 94). Ten pairs of comparatively short notogastral setae present, setae *c*₂ slightly fusiform, all the others simple but erect and mostly straight. All setae slightly ciliate. Lyrifissures in normal position.

Lateral part of podosoma: Pedotecta I large, distinctly foveolate, as is the surface between the acetabula of legs II and III. Both corners of pedotecta II-III rounded, the posterior part also ornamented (Fig. 95). Posterior part of discidium distinctly protruding.

Ventral region (Fig. 93): Epimeral region typical for the genus, its surface weakly foveolate anteriorly and very roughly foveolate posteriorly. Epimeral setal formula: 3 - 1 - 3 - 3, setae *1c* arising very far laterally, observable only in lateral aspect. Setae *1b*, *3b*, *4b* and *4c* long, setae *3c* conspicuously long and unusually



FIGS 92-95

Otocepheus verrucosus sp. n. — 92: body in dorsal aspect, 93: body in ventral aspect, 94: dorsosejugal region, 95: podosoma in lateral aspect.

directed laterally. Along border IV a characteristic ornamentation of rugae observable (*opp*). Surface of ventral plate pustulate like the notogastral one, surface of genital plates with 2-3 longitudinal crests. All setae in the anogenital region long, partly filiform, setae ad_3 arising in marginal position very far from the anal aperture. Lyrifissures *iad* located near to the anal openings, but clearly in inverse apoanal position.

Legs: Surface of femora without any characteristic sculpture. Setae l'' of genua II and III spiniform. Type of ultimate setae: L - S - S - S.

Remarks: The attribution of the new species to the genus *Otocepheus* is rather problematic, because the shape of pedotecta II-III is atypical and the posterior corner of the fishtail-shaped part of the body absent. However, the habitus, primarily the form of the notogaster, and the absence of the median notogastral condyles indicate the true relationship of this species. It is readily distinguished by the conspicuously long setae $3c$, which are unknown elsewhere in the family.

Derivatio nominis: The species name refers to the tubercled sculpture of the notogaster.

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